



FRIDAY, DECEMBER 17.

The Plattsmouth Bridge.

(Continued from page 654.)

SUPERSTRUCTURE.

The superstructure of the Plattsmouth Bridge may be divided into three parts: the iron viaduct, the deck spans and the channel spans. The two former are entirely iron, the last largely of steel. The general specification on which the entire superstructure was proportioned provides for a uniform moving load of 2,000 lbs. per lineal foot, preceded by two locomotives, each weighing 150,000 lbs. on 50 ft., the additional 50,000 lbs. of locomotive weight being supposed to be concentrated on a length of 20 ft. The structure is also designed to resist a lateral wind pressure of 500 lbs. per lineal foot on the floor, and 200 lbs. per lineal foot on the top chord of the through spans and the bottom chord of the deck spans; these quantities are about equivalent to a wind

driving-wheels. The character of the floor system is such that it is not believed that this strain will ever be realized.

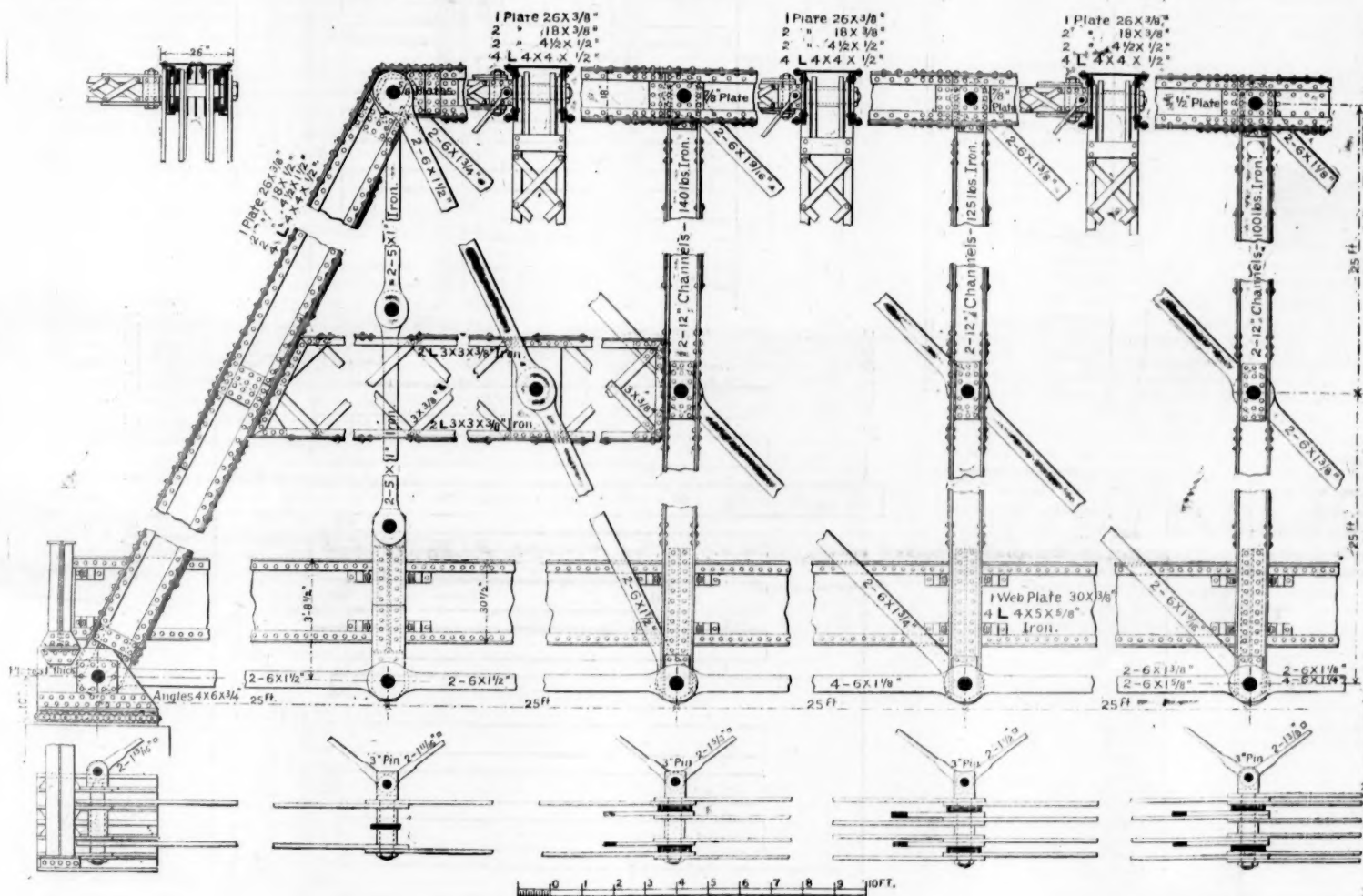
The entire viaducts are of wrought iron, except the bed-plates between the wrought iron posts and the masonry, which are cast. The whole length of the viaduct at the eastern end of the bridge (1,440 ft.) was erected in two weeks; it is built on the grade of 1 in 200.

DECK SPANS.

There are three deck spans, each 200 ft. long between the centres of end pins. The trusses are 30 ft. deep and 16 ft. apart between centres. Each truss is divided into 8 panels of 25 ft. each, the general design being that of a single system Pratt truss with inclined end posts. The floor system rests on the top chord at the panel points, and consists of riveted cross-floor beams, with longitudinal stringers; the stringers are placed 9 ft. apart between centres and riveted to the webs of the cross-bearers; each stringer consists of a $\frac{3}{8}$ -in. web plate and four angles; they are connected by a stiffening-frame at the centre of each panel with diagonal lateral rods. The flanges of these stringers are identical with those of the viaduct, so that the floor is practically uniform throughout. The grade of 1 in 200 on the east viaduct is continued across the deck spans; the trusses are built level, each span being

lowed to these members is 15,000 lbs. per square inch, the sections being so proportioned as to carry this strain on the two side pieces of the member, the central part of the top plate being relied upon only for lateral stiffness. The connection between the top chord and the end posts and between the end posts and bolsters are pin connections, all parts being entirely of steel. On these pins the pressure per square inch, measured on the diameter and not on the semi intrados, is limited to 20,000 lbs. per square inch.

The steel bars in the bottom chord and the main ties were rolled by the Kloman process in a universal mill, the motion being reversed while the bar is still between the rolls, the heads being subsequently forged into shape with a steel hammer, and the whole bar afterwards annealed. Of seven full-sized bars which were tested to breaking, not one broke or showed any weakness in or near the head. Fig. 9 is a diagram of strains of these spans. The maximum strain allowed on steel in tension is 15,000 lbs. per square inch, this occurring only in the middle panels of the bottom chord, and being reduced to 12,500 in the end panels; in the web the strain per square inch varies from 10,000 lbs. per square inch at the centre to about 12,500 lbs. in the end ties, except under the extraordinary supposition of the entire weight on the driving-wheels of two 75-ton



PLATTSMOUTH BRIDGE—DETAILS OF FOUR-HUNDRED-FOOT SPAN.

pressure of 30 lbs. per square foot on the bridge when covered by a train, and to 50 lbs. per square foot on the empty bridge.

VIADUCTS.

The iron viaducts consist of 48 spans of 30 ft. each at the east end of the bridge, and four spans of 30 ft. each at the west end. The design is that of riveted plate girders resting on wrought-iron posts. The girders are 38 in. deep and spaced 9 ft. between centres, each girder consisting of a $\frac{3}{8}$ web-plate and four angle irons, two in each flange. They are connected by stiffening frames 10 ft. apart, with diagonal rods for lateral bracing above and below. Each iron post is composed of two 9-in. channels and a plate, the section of the post being $13\frac{1}{2}$ square inches. The posts have a batter of 1 in 8, two posts forming a bent. At the base the iron posts rest on small piers of masonry. These piers are 3 ft. square, with a concrete foundation 5 ft. square, 7 ft. below the surface of the ground. Each post is anchored to the masonry by a $1\frac{1}{2}$ in. rod, extending through the entire masonry into the concrete foundation. The posts of the bent are connected by transverse struts at the centre and top, with diagonal rods between; there is no strut at the bottom, the anchorage of the masonry being relied upon to resist any lateral thrust. The bents are connected together in pairs by bolting the girders to the top of the posts and by longitudinal struts half way up. They are braced longitudinally with rods which couple on a pin passing through the centre of the struts. This bracing is calculated to resist the thrust due to the action of a locomotive exerting on a single pair of bents a horizontal pull of 25,000 lbs., this being the estimated adhesion of an engine carrying 100,000 lbs. on its

placed one foot higher than the span east of it, and the grade is then provided for by varying the depth of the cross-floor beams at the ends, where they rest on the chords.

These three 200-ft. spans are entirely of wrought iron, except the pins, which are of steel. They rest upon heavy cast-iron pedestals anchored to the masonry. The west end of the westspan has a bearing in niches left in the masonry on the east side of pier III.

CHANNEL SPANS.

The channel spans are two in number, each measuring 400 ft. long from centre to centre of end pins, the total length from centre to centre of piers being 402 ft. The details of these spans are shown by fig. 8. The trusses are 50 ft. deep and placed 22 ft. apart between centres. Each span is divided into sixteen panels of 25 ft. each, and the general design is that of a double system Pratt truss with inclined end posts.

In these two channel spans the floor, the intermediate posts, the lateral struts, the vibration rods and vertical suspenders in end panels, the portals and all nuts of every kind except the jaw nuts on the bottom chord pins are of iron. The top chord, the end posts, the tension members, the pins, the bolsters, the rollers and bearing plates, and the jaw nuts are of steel.

The top chords and end posts are riveted steel members formed of plates and angles and measuring 28 in. wide by 19 in. deep over all, the under side being open and laced. In the manufacture of these pieces the steel was first punched with $\frac{3}{4}$ -in. holes, then assembled and the holes reamed to one inch, and then riveted without taking apart, the rivets being of low-carbon steel. The maximum compressive strain at

locomotives being carried entirely by the same system; in this case the maximum strain on the end of the diagonals will slightly exceed 14,000 lbs. per square inch.

The counter ties and lateral rods are also of steel. The counters are flat and were rolled in the same manner as the main ties. The laterals are square and were rolled in the same mill between grooved rolls, the bar being run through to the head, the mill reversed and the bar run entirely out, and subsequent passes being taken in a similar manner between smaller grooves; the screw-end was then enlarged by upsetting and forged down. The strain on counters is always less than 10,000 lbs. per square inch; that on the laterals is limited to 22,000 lbs. Tests made of these light steel bars showed a superior proportional excellence fully equal to that commonly found in small sections of wrought iron as compared with large sections.

The intermediate posts are of wrought iron, each post consisting of two channels laced at the sides. Each post has three pin connections; at the top with the top chord, at the bottom with the bottom chord, at the centre with the diagonals, each diagonal being made in two lengths and coupling on to this central pin. This arrangement holds the post rigidly at the centre, supports the diagonal from sagging, and proved in every way a satisfactory detail. These intermediate pins are connected with transverse struts between opposite posts of the two trusses, with wind-bracing diagonal rods between these struts and the top lateral struts. The transverse floor beams, which are 39 inches deep, are riveted to the sides of the posts, forming a rigid attachment. Between the two inclined end posts is placed a wrought-iron riveted portal, the sides of which are extended to the level of the

floor. The end posts are also stiffened by longitudinal struts connecting them with the centres of the first vertical posts, which are rigidly held by the central pin connections.

The floor stringers are precisely the same as those of the deck spans. They are attached to the web of the transverse floor beams, and the floor is practically uniform with that of the deck spans and the viaduct. All lateral rods are placed in pairs, as are also the wind-bracing rods between the intermediate posts. The connections are everywhere made on turned steel pins, the holes in the rods being accurately bored and the rods being tightened with sleeve nuts. The lateral pins pass through the main pins, excepting on the bottom chords, where the connection is made with steel jaw nuts.

In the design of these trusses care was taken to secure uniformity in sizes. All the pins except the lateral pins are of the same diameter, 4½ in.

STEEL.

The steel used in the Portsmouth Bridge was manufactured by Hussey, Howe & Co., of Pittsburgh, in an open-hearth furnace. The specifications required that a sample (about $\frac{1}{2}$ in. diameter) should be taken from every melt, and that this bar should bend 180 degrees around its own diameter without cracking; that it should have an elastic limit of at least 50,000 lbs., and an ultimate strength of at least 80,000 lbs.; and that it should elongate 12 per cent. before breaking, and show a reduction of 20 per cent. at the point of fracture. The percentage of carbon was fixed at 0.35.

A difference in the strength of small and large-sized bars corresponding to that which exists in iron bars was found in the steel. The finished bars measured $6 \times 1\frac{1}{2}$ in. to $1\frac{1}{2}$ in.; when tested in the government machine at Watertown were found to have an elastic limit of 37,000 lbs., and ultimate strains of from 66,000 to 78,000 lbs. The modulus of elasticity below the elastic limit was exceedingly uniform. Smaller sizes, used in counters and laterals, approximated closely in their strength and elastic limit to the test samples.

FLOOR

The construction of the floor of the Plattsmouth Bridge is shown by figs. 10 to 13. It is uniform from one end of the permanent structure to the other. It is so designed that it is believed it could safely carry a derailed train for any distance.

The iron stringers are placed 9 ft. from centre to centre. On these stringers rest oak ties 9 in. square, and generally 13 ft. long, these ties being only 6 in. apart in the clear. The ties are held in place by two oak guard timbers or ribbons, these timbers being 10 in. square and sized down 1 in. over each tie; the guards are 10 ft. 4 in. apart in the clear, and fastened with a 1-in. bolt to every fourth tie. Inside the rails are placed two lines of 4 x 5 in. angle iron with the long side flat, laid to a gauge of 3 ft. 8 in. over all, and bolted to every tie with a 1 in. bolt; this arrangement leaves a space of 6½ in. between the angles and the rail, which is wide enough for a derailed wheel to travel in. The nuts are on the upper ends of all the bolts, so that they can readily be tightened by the bridge watchman.

Every fourth tie is 16 ft. long, projecting two feet on the outside of the ribbons, and on these projecting ends is laid a footwalk composed of two lines of 2 x 10-in. oak plank. Every twentieth tie is 18 ft. long, projecting one foot on each side of the footway, and carries a wrought-iron stanchion, through the eye at the top of which is passed a 1/4-in. wire rope, which serves as a hand rail.

At the west end of the bridge, where the short piece of viaduct is on a sharp curve, the ties are 9 x 12 in., and sized to give a slight elevation to the outer rail.

Ties of the same dimension as those on the bridge are laid across the masonry of the abutments, and on these the ends of the guard angles are brought together in a point (see fig. 13) in the centre of the track by pieces of 4-in. oak plank cut to shape, bolted to the ties and plated on the face with a wrought-iron strap.

The following are the names of the engineers employed on this work:

Chief Engineer, George S. Morison.
First Assistant Engineer, stationed at Plattsmouth, Henry W. Parkhurst; Assistants, Benjamin L. Crosby, W. G. Dilworth; Assistant Engineer of Superstructure, C. C. Schneider; Inspectors, Jacob Jung, A. Lavandeyra.

The principal contractors engaged in this work were the following :

Masonry, Reynolds, Saulpaugh & Co.
Concrete, J. C. Goodridge, Jr.

Pneumatic foundation works, Wm. Scoy Smith.

Superstructure of 400-ft. spans, Kaysville Bridge Co.;
Foreman of erection, W. Baird.

Viaduct and 200 ft. span, Kellogg & Maurice; Foreman of erection, J. B. Ryan.

Grading of approaches, N. S. Young.
Enlargement of west approach and filling temporary trees.

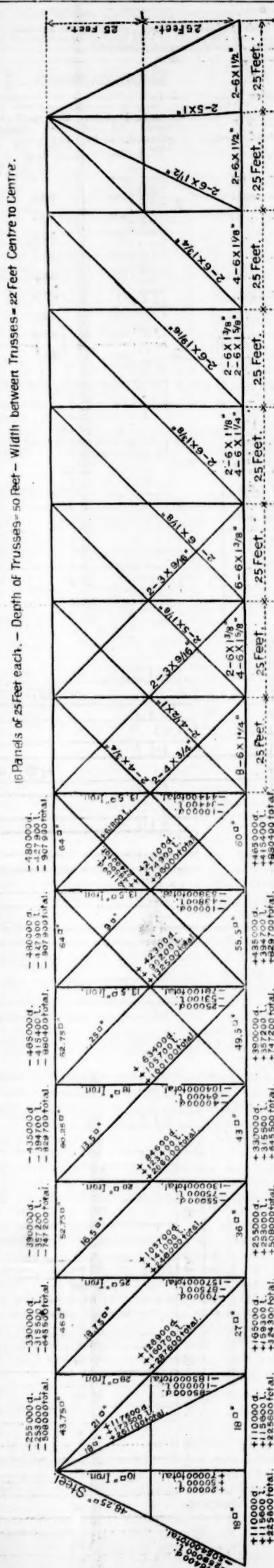
little in east approach (this work not yet completed), S. Dwight Eaton.

Contributions.

Experience.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It is usual for railroad managers, and others whose business it is to employ men to fill positions of great responsibility, to place great reliance on men of long experience. The natural supposition is, that a man who has long filled a responsible position is better fitted for such a position than one whose experience is limited as compared to that of the veteran. If the general superintendent of a railroad was



PLATTSMOUTH BRIDGE—STRAIN-SHEET.

looking about for a master mechanic or road-master, and he was deluged with applications for these and other responsible positions, he would naturally choose from among those of the longest experience; character habits, etc., being equal.

In a majority of instances he would be correct in his selection, but unfortunately many have found themselves sadly disappointed in their estimation of the value of experience. In other words, experience is worth nothing to some men, and these men are more numerous than many suppose. A few weeks since, the writer met a man who is in charge of 160 miles of track. Thirty years ago this man was road-master on a New-England road, 118 miles long, and has followed the business ever since in various parts of the country. The writer was not personally acquainted with this man, but had heard of him occasionally, and his reputation was not above the average of men in that line of business. He was in charge of a gang of track layers in a yard, and, to put it mildly, his work would hardly pass inspection. A switch he had just completed was a shackling affair at best, and would have been discreditable to a section foreman of limited experience. The switch rails were of unequal length. The tie on which the heel of the switch rested lay at an angle of thirty degrees with the rail. One of the switch rails was a snug fit at the head-block, while the other lacked nearly four inches of filling the space. The rails were cut in a bungling manner, and will soon broom up. The tie bars were a quarter of an inch too wide in the clasp to fit the rail, and there was more than half an inch play in the connection rod, the clasp being too large and the bolts too small. He explained this by saying that the rods were made for a rail of a larger pattern, and that a rough bolt cannot be made to fit snugly. The switch-stand was of a new pattern and design adopted on this road. Its general appearance is not unlike a ship's capstan, and it was designed to be fastened to the head-block sill by rag-bolts. It was, however, bunglingly spiked down by crooked spikes that were too large, which broke the casting at one of the holes. The top of the stand is circular, with a notch or recess in its opposite edges by which the switch is held in position. The switch is moved by a horizontal lever attached to the perpendicular rod or switch lamp-post in the usual manner, except that the lever is jointed near the outer edge of the stand, its outer end hanging pendent and filling the recess before mentioned. This is an effective fastening, but is unhandy to operate. To change the switch the operator must take hold of the lower end of the lever which hangs perpendicular, and carry it outward and upward to a horizontal position at the top of the stand. This, of course, carries the pendent portion of the lever out of the recess, and the switch is unfastened. The operator now performs a pilgrimage to the other side of the stand, where he finds a recess to receive the outer end of the lever as he carries it downward and performs a quarter circle movement with his hand. It would be difficult to conceive of a more unhandy switch movement, and this is adopted by a veteran as a standard switch.

The yard was full of men who acted as though they had just been gathered in from a stampede or were on the point of stampeding. There was no system in conducting the work, and the yard was piled with ballast and track material which all seemed to be in the way of the workmen. There was nothing about the premises but might have been improved under the management of an average section foreman of five years' experience and a natural taste for that kind of work, and a habit of doing his work in a thorough manner.

This man of experience spoke sneeringly of the idea of organizing associations and holding conventions for the interchange of ideas for the purpose of gaining information. "What," said he, "could I have learned by attending the Road-masters' Convention? Probably no member of the Association has been in the business as long as I have, and I am too old to learn now." The writer had it in his mind to remark that men of his experience were just the ones to attend conventions, so that younger members might profit by the information they could gain from them; but a glance at the aforesaid switch changed the idea. One occasionally meets with such "barnacles" as these in other departments of railroad service, and how they manage to hold on year after year, impeding railroad progress, is probably best known to themselves and their superior officers.

It is by no means intended here to belittle the value of experience, but to show that it is frequently overrated by those who have authority to fill responsible positions. Long service is beneficial only to those who have an earnest desire to excel in their calling or profession, and who have a just appreciation of the value of information that may be gained from others. A man has no moral right to refuse instruction or to neglect any opportunity for gaining a thorough knowledge of matters pertaining to his profession, and the man who considers he has nothing to learn may do a great deal of mischief. A young man chooses the medical profession. He gets a diploma, frames it elegantly, hangs it up in his office, and hangs out his shingle and begins practice. He gazes fondly on that diploma and considers himself at the head of the profession. He plods along in a so-so sort of way for several years, and he is regarded as an experienced physician; but he kills people under just the same treatment that he did years ago, before the few volumes in his office became dusty and his sign faded and weather-beaten. His volumes are few, because when he went forth from the institute he fancied he carried with him all the knowledge of the profession that would ever be of any use to him, and a few standard works were all that would be required during his life; and they are dusty because he rarely has occasion to use them for reference. He

old stereotyped prescription. People employ him because of his experience, and they have confidence in his skill; but, fortunately, his patients are few as compared to those of his classmate, whose bookshelves are full of well-thumbed works of recent date, and whose table is covered with the latest medical publications. This man has not followed a beaten path, but has studied causes and effects; he has not only profited by his own experience, but he has the experience of the whole medical profession at his fingers' ends. Instead of filling untimely graves, he is filling his purse, and experience is worth something to him; not only his own, but he is glad to profit by the experience of others. He is not above picking up little scraps of knowledge by the wayside and using them for the benefit of the public, and he is honored among men.

This is not a fancy picture, and every reader of this article can bring to mind cases in point. The neglect of the physician to improve by experience, or to gain knowledge, is nothing short of criminal. Many are sent to untimely graves as the result of his ignorance and self-conceit, and no less criminal is the man who has charge of the construction and repairs of a railroad, and pursues his course blindly or utterly regardless of the progress made by others, and of the lamentable results of his own stupidity, which leads to the destruction of life and property. In selecting a man to fill an important position, the main question is not so much the length of his experience as the breadth of it, or, in other words, how much his practice has been worth to him. To a progressive man a few years' experience is worth more than a life-time to one who is "troubled with the big head." Some one has said that "to sneer and denounce is a very easy way to assume a great deal of wisdom and to conceal a great deal of ignorance," and he might have added, that to boast of long experience frequently covers a great deal of incapacity. Railroad managers in making appointments will do well not to overrate the value of the services of the man who claims he has nothing to learn.

WILLIAM S. HUNTINGTON.

Tests of Transverse Strength and Resistance to Spike of Various Woods.

BY A. M. WELLINGTON, C. E.

The following tests were undertaken, by instructions of Charles Latimer, Chief Engineer of the Atlantic & Great Western Railroad, to determine the effect of the Thilmeny (sulphate of baryta) preservative process upon the strength of woods, and the comparative value of various treated and untreated woods for cross-ties.

The samples tested are said to have been taken from the same stick, one half having been treated by the aforesaid process and the other half left untreated. The woods when treated (some 6 or 8 months since) were green, but have since had time to become moderately well seasoned.

Two samples were cut off of each test piece and dressed carefully to dimension ($1\frac{1}{2}$ in. square by 18 in. long) for test of transverse strength, leaving one good-sized block of each piece for test as to its power of holding a spike.

A summary of the tests for transverse strength is given in Table 1 herewith. From this it appears that there is a clear loss of transverse strength in the process of preparing, varying from 20 per cent. in the case of pin oak to 0 in the case of elm, and averaging, for all the seven kinds of wood tested, 11 per cent. Excepting in the case of elm, every one of the woods tested showed a decided loss of strength, so that there can be little doubt that this is a legitimate result of the process. The loss, however, is not very great, and it may be doubted if the gradual process of decay in unprepared wood, would not more than balance it even before any decided signs of decay were visible.

A summary of the tests for the resistance of spikes is given in Table 2 herewith. These tests were conducted as follows: The test blocks were reduced to a uniform thickness of $4\frac{1}{4}$ in., this thickness being just sufficient to give a full bearing surface to the parallel sides of the spike when driven to the usual depth, and allow the point of the spike to project outwards. It was considered that the bevelled point could add very little to the holding power of the spike, and it was desired to press the spike out again by direct pressure after turning the block over. The force was applied by a loaded lever, an iron bar 14 ft. long and $1\frac{1}{2}$ x 4 in. section, the fulcrum being at one end and the spike to be driven or expelled placed 2 ft. from it. A fulcrum was obtained by a mortise in the frame of the shop. An apparatus of this form works well in every respect.

From Table 2 it appears that as respects resistance to spike the preservative process probably has no effect pro or con., seeming to be, if anything, a slight advantage for the harder woods and a slight disadvantage for the softer woods.

The following further deductions may be drawn from Tables 1 and 2:

1. A beech tie, if effectually preserved from rotting, would be a better tie than white oak; and a red or pin oak tie about as good.
2. Elm, black and white ash, if effectually preserved, will hold a spike about two-thirds as well as beech or oak, and about one-third better than chestnut. They are also but little inferior to oak in transverse strength, black ash being the weakest.
3. Soft maple and sycamore hold a spike about four-fifths as well as chestnut; about two-fifths as well as oak or beech, and about one-half better than hemlock.
4. Seasoned white oak is about one-third less effective than green timber in holding a spike. On the other hand the transverse strength of green oak is about one-third less than seasoned oak.
5. The force required to drive a spike and to pull it out

TABLE 1.
Showing Tests of Various Woods for Transverse Strength, treated and untreated by the Thilmeny (sulphate of baryta) preservative process. All test pieces of each kind of wood were cut from the same stick. All the woods, except as specified, had been cut 6 to 8 months, and were partially seasoned.

KIND OF WOOD.	Natural Wood, untreated.		Prepared Wood.		Per cent. of loss of transverse strength from process of preparation.	Average coeff. for both prepared and unprepared woods, adding 11 per cent. to coeff. of prepared woods.	Coeff. given by Trautwine.
	Breaking load for pieces $1\frac{1}{2}$ in. square by 15 in. long.	Equivalent coeff. for pieces 1 in. square by 1 ft. long.	Breaking load for pieces $1\frac{1}{2}$ in. square by 15 in. long.	Equivalent coeff. for pieces 1 in. square by 1 ft. long.			
	Lbs.	Lbs.	Lbs.	Lbs.			
White oak, well seasoned.	957 (989)	633	850 (825)	527	14.2	633	600
White ash.	880 (826)	593	800 (832)	527	14.2	585	650
Beech.	864 (804)	553	770 (801)	513	7.2	568	550
Elm.	745 (763)	489	703 (763)	489	0.0	543	600 to 350
Pin oak.	954 (941)	602	740 (755)	482	20.0	535	550
White oak, green.	808 (747)	479	636 (643)	411	13.7	456	550
Soft maple.	739 (742)	476	636 (643)	411	13.7	456	550
Black ash.	685 (685)	439	620 (640)	409	6.9	454	300
Sycamore.	645 (628)	401	599 (550)	332	17.2	368	500
Average per cent. of loss of strength from process of preservation.					11.0		

TABLE 2.
Showing Tests of Various Woods for Resistance to Driving and Pulling Spikes, treated and untreated by the Thilmeny (sulphate of baryta) Process. All test pieces of each kind of wood were cut from the same stick. All the woods, except as specified, had been cut 6 or 8 months, and were partially seasoned. Spikes used for test were of standard size and form, viz.: $5\frac{1}{2}$ x 9-16 in. Thickness of blocks, $4\frac{1}{4}$ in.

KIND OF WOOD.	ACTUAL RESISTANCE IN LBS.				RELATIVE RESISTANCE (av. of both prepared and unprepared, taking force to extract spike from green white oak (6,523 lbs) as 1.			
	Natural Wood, untreated.		Prepared Wood.		Av., both prepared and unprepared.		To driving spike.	To pulling spike.
	To driving spike.	To pulling spike.	To driving spike.	To pulling spike.	To driving spike.	To pulling spike.		
Beech.	5,216 (6,743)	5,673 (5,978)	7,288 (7,472)	8,873 (8,420)	7,107	7,199	1.085	1.10
White oak, green.	5,970 (5,820)	7,170 (6,523)	5,820 (5,809)	5,820 (5,820)	5,820	6,523	0.80	1.00
Pin oak.	5,216 (5,308)	6,638 (6,553)	6,117 (5,353)	6,135 (6,201)	5,360	6,377	0.815	0.975
White ash.	5,521 (5,953)	4,500 (4,560)	6,588 (5,978)	6,267 (6,283)	6,118	4,560	0.935	0.75
White oak, well seasoned.	6,433 (6,433)	5,128 (4,281)	4,453 (4,453)	4,453 (4,453)	6,433	4,281	0.98	0.65
Black ash.	3,980 (4,202)	4,408 (4,638)	4,453 (4,301)	3,340 (3,300)	4,123	3,964	0.63	0.605
Elm.	4,453 (4,606)	3,596 (3,690)	4,453 (4,300)	4,148 (4,175)	4,453	3,932	0.88	0.60
Chestnut, green.	3,980 (3,901)	3,700 (3,260)	3,980 (3,980)	3,980 (3,980)	3,691	3,260	0.56	0.50
Soft maple.	4,148 (3,843)	3,645 (3,111)	3,843 (3,645)	2,725 (2,877)	3,744	2,994	0.575	0.46
Sycamore.	3,538 (3,708)	3,188 (3,188)	3,691 (3,833)	1,968 (1,968)	3,815	2,578	0.585	0.395
Hemlock.	2,910 (2,910)	1,906 (1,906)	2,910 (2,910)	2,910 (2,910)	2,910	1,906	0.44	0.30

are as nearly as may be equal with hard woods, it being often the case that considerably more dead load is required to push out the spike than to drive it in. On the other hand, with the softer woods the force required to drive the spike is about one-fifth greater.

6. It is a peculiarity which may be frequently noticed in Table 2, that a spike which has required a greater force than another to drive it into the same wood will require less force to drive it out, and vice versa.

7. No difference could be discovered in the force required to push out a spike on account of the difference in time that the spike had been driven. Some of the spikes were pushed out immediately, some left in several hours, some were left in over night, but no difference on that account could be discovered.

The following further notes as to the friction of hydraulic press plungers may be a convenience to those who wish to make some single tests like the above. A white oak block which had been well tested for resistance to spike by direct pressure, was tested in a hydraulic press, the usual gauge having been removed and the standard steam gauge of the shop attached to it. This gauge read to a maximum pressure of 300 lbs. per inch, which is a very light pressure for such a press in ordinary working, but more than sufficient to drive or expel a spike. With so light a resistance the action of the press is far more like a blow than an even pressure, and the pointer of the gauge fluctuated greatly at each stroke of the piston. Readings were taken, however, at the maximum point reached at each stroke, which were approximately uniform. It was considered that the decrease in resistance from the sudden blow on the spike at each stroke of the plunger would, roughly speaking, balance the increase of gauge-readings which would necessarily result from the momentum of the moving parts of the gauge when rapidly fluctuating. The following was the result, four spikes in each case having been tested and averaged:

Resistance as determined in the press.	6,812	5,190
by lever and direct pressure.	6,431	4,281
Difference.	379	909
Difference per cent. (average 11.5).	5.6	17.5

The conditions were so different that the above cannot be considered as a fair indication of the friction of the press, but it indicates the proper allowance to make for other tests under the same conditions.

—Mr. Aurin B. Nichols has resigned his position as Engineer of the Bureau of Railroad accounts to accept a position on a railroad in Pennsylvania. It is understood that he resigned chiefly on account of the small salary paid, and the Auditor will ask Congress to increase it.

The Rights of Holders of Preferred Stock.

A large part of the last report of President H. J. Jewett, of the New York, Lake Erie & Western Railroad, is devoted to a discussion of a claim that has been set up by some of the preferred stockholders of that company that they are absolutely entitled to a dividend, because the net earnings have been sufficient to pay one. The discussion applies specially to this company, but it also has a general interest. We give it below:

Within the last few weeks divers communications have been addressed to the President of this company, in some instances urging, as a measure of policy, and in others demanding, as a matter of right, that the board declare, and pay, a dividend on the preferred stock out of the earnings for the fiscal year just closed.

There has been no difference of opinion among the members of your board of directors as to the policy to be pursued in the management of your property. Nor have they supposed, until very recently, that there was any room for a difference of opinion between them and the shareholders, whether of the preferred or common shares, as to the wise course to pursue for the protection of all interests. The board fully recognizes the fact, that when the company is in condition to make any declaration of dividends, the preference shareholders are entitled to the full 6 per cent. before the holders of the common stock can demand any amount whatever, but that, with this exception, they are in all respects equal, having the same interests, and subject to the same duties and obligations for the proper maintenance and improvement of the property.

When it became manifest that the Erie Railway Company, in the then condition of its road and property, could not meet and discharge its fixed liabilities, much less make dividends to its shareholders, it was agreed by all those in interest that a reorganization was necessary, and that in such reorganization provision should be made for such additions and improvements to the road as would enable the company to operate it to its utmost capacity, and with the greatest economy, to the end that it might discharge its obligations to the public and to its creditors, as well as realize a reasonable return to its shareholders. How these improvements and additions could be provided for became a subject of the most serious and anxious consideration.

To aid in accomplishing these ends it was determined to make an assessment of four and six dollars per share on the common stock, and two and three dollars per share on the preferred stock, and to ask the first consolidated bondholders to fund their coupons for a period equal to three years, and the second consolidated bondholders to fund their coupons for a term equal to five years. It was hoped that this concession by the bondholders, and the amount thus to be realized from the stockholders would enable the company to accomplish very much in the way of the improvements absolutely needed for the successful working of the road; and that with the surplus earnings thereafter to be realized by reason of such improvements and after the payment of its expenses, outlays, and fixed charges, the company would be enabled, at no very distant day, to make a distribution among its shareholders in the way of dividends; recognizing the fact, however, that the preferred shareholders would be entitled to the full rate of their dividends before the holders of the common stock

would be entitled to anything. Your board did not suppose that the propriety of applying all the earnings, after the payment of expenses and fixed charges, to the improvement of the property was questioned by anyone, as they understood the whole plan of reconstruction to be largely based on that policy.

The bondholders would not likely have made any concession from their claims had they supposed that the fund to be realized from them was, to the extent required, to be applied to the payment of dividends to the preferred shareholders, nor would the holders of the common stock have been likely to pay their assessments, so much in excess of the payments made by the preferred holders, had it been intimated to them that the increased earnings, to result from the improvements made, were to be used in the payment of dividends to preferred shareholders before the property was put in condition to earn to its full capacity and with the greatest economy.

The purpose to be accomplished, as understood by your board, was to avoid, as far as possible, the increase of the fixed liabilities of the company, to improve and complete the road to its earnings and the assessment fund, and then to give to the preferred shareholders the full benefit of their preference, reserving to the holders of the common stock that which remains.

Hence, in the annual report of the Receiver of the Erie Railway Company to the board of directors for the year 1876 (which report was communicated to you by said board), there is a statement of the amount estimated as necessary to make the required improvements, and the Receiver remarked that, if certain of the improvements were made, "together with some of the proposed terminal facilities, the capacity of the road to earn at a largely reduced expense would be greatly increased, and it would probably be able, out of its earnings, in addition to discharging its fixed obligations, to make the balance of the improvements required."

And again, in the report of this board to the shareholders for the year 1878, in referring to the needed improvements of the property, and to the various sources from which the means to make such improvements were to be derived, and naming the surplus profits, after paying the interest, as one of the sources, they say, "The amount of such profits that may be applicable to improvement cannot be safely assumed, including the surplus revenue from June 1 to Sept. 30, 1878, for the next two years, at more than two and a half millions dollars."

Many other references might be made to the actions and doings of those having charge of the reconstruction scheme, tending to show that the surplus earnings, after the payment of expenses and fixed charges, were chiefly relied on to carry out the plan.

It is now claimed by some, that whatever may have been the policy, or intention, of those having charge of the plan of reconstruction, previous to the organization of this company, such policy or intentions were superseded by the provisions of the certificate of incorporation, which, after its adoption, became the law of the company, and is binding upon all parties. Such may be the legal effect of the adoption of the certificate of incorporation, and it may be it will bear the construction now sought to be given it. It is clear your board did not so understand it when they made the report referred to, the date of which was subsequent to the adoption of such certificate.

It is also certain that, notwithstanding these and other expressions of like tenor from your board (and others), and their conduct in accordance therewith, for the two years last past, no one, until within a very short time, has called in question either the wisdom or the lawfulness of the policy or course pursued. Yet, if it be true that, by virtue of the certificate of incorporation, the preferred stockholders are entitled to their dividends out of the profits, regardless of the necessities of the company, and that such "profits" are what remain after the payment of the current expenses, then the board has been in error, and, instead of applying the surplus earnings or profits (after the payment of current expenses) to the liquidation of the fixed charges and to improving the property, they should have set apart, even before the payment of the fixed liabilities, an amount sufficient for a dividend of 6 per cent. to the preference shareholders, and it is to this question the attention of the board has been carefully directed.

The thirteenth article of the certificate of incorporation, after providing for the amount of the preferred stock to be issued, the number of the shares, and the amount thereof, says, "entitling the holders to non-cumulative dividends at the rate of 6 per cent. per annum, in preference to the payment of any dividend on the common stock, but dependent on the profits of each particular year, as declared by the board of directors."

Railroad companies, in stating their annual accounts, credit their earnings and debit their expenses. The balance, if any remains to the credit, is called surplus, or net earnings, which, with all well-managed companies, is applied to the payment of whatever fixed charges may exist, to the improvement of the property, or to such other purposes as the board, in the exercise of a sound discretion, may deem best for the good of the company; and whatever balance may remain may be distributed to its stockholders. But it is claimed, in the present case, that the word "profits," as used in the certificate of incorporation, has a legal significance, and that, when such profits are ascertained in the usual mode of stating the accounts, they must (or so much thereof as is necessary) be applied to the payment of a dividend on the preferred stock; that the right of the shareholders to a dividend does not depend on its declaration by the board, nor on the condition of the company, nor upon any fact other than a statement of the accounts; and that if such accounts, as presented to or declared by the board, show that there is a "profit," or a balance after the payment of expenses, then the right to a dividend attaches, and that the board has no right to otherwise dispose of the fund, regardless of what the necessities of the company may be. And it is because of this view of the case, as understood by the board, that the present demand is made.

The board of directors may declare a dividend. They may direct the dividend to be paid out of the net profits. But they cannot, by any form of declaration, create net profits. As a matter of convenience, in the keeping of the accounts, the difference between the expense of conducting the business of the company and its earnings may be stated as net profits. No doubt, it is the common practice to so state it. But whether or not there has been any profit, subject to division among the shareholders, depends upon a result to be ascertained by an analysis of all the accounts, and not upon the terms used in their statement, or the declaration of the board.

The board is, therefore, advised that the words "as declared," used in the certificate of incorporation of this company, do not apply to the word "profits," but to the dividend to be declared, and requiring of the board, before it declares any dividend to the common shares, to declare and pay a dividend of 6 per cent. to the preference shares. If the difference between the earnings and the current expenses is net profits, and the language used in our certificate of incorporation applies to the profits and not the dividends, and the net profits are not sufficient to pay the interest and other indebtedness, the board would have to prefer the preferred shareholders to all classes of creditors, because no exception is made, and the contention being that the profits, as declared

by the board, shall be applied to the payment of a dividend, etc. But such an inconsistency could not have been contemplated by any one.

Your company is a New York corporation, subject to all the laws of the state, and your board of directors is also, individually and collectively, subject to such laws, and to all the duties, restrictions and penalties they require and impose. The general law of the state provides that "It shall not be lawful for the directors or managers of any incorporated company in this state to make dividends, excepting from the surplus profits arising from the business of such corporation," and makes the directors individually liable for any payments made on account of dividends in excess of such surplus profits.

In a case in almost every respect analogous to our own, wherein preferred shareholders claimed that they were entitled to their dividends out of the net earnings, regardless of the general necessities of the company and of its other indebtedness, Judge Blatchford, of the Circuit Court of the United States, in refusing the application for an order to compel the payment of such dividends, and in defining what constituted "net earnings," said: "When all liabilities are paid, either out of the gross receipts, or out of the net earnings, the remainder is the profit of the shareholders, to go toward the dividends, which, in that way, are paid out of the net earnings." And in the same case, when before the Supreme Court of the United States, that Court, in affirming the decision of the Circuit Court, said: "The preferred dividends were to be paid out of the 'net earnings of the road.' The lexical definition of net 'is clear of all charges, or deductions' (Webster). 'That which remains after the deduction of all charges, or outlay, as net profit' (Worcester). The popular acceptance of the term is the same." The error, if any has been committed, has been in the making of the improvements to the road and in the application to that purpose of the surplus earnings, so far as realized, and the use of the credit of the company to the extent needed. It must be borne in mind, however, that if these improvements had not been made, there would in all probability have been no profits about the distribution of which any question would have been necessary, because the increased earnings of the road, and the economy with which it has been operated, are attributable largely to its improved condition and to the increased facilities produced by such outlays and such use of its credit. But the board is not willing to admit that in this they made any error, or in any respect departed from the heretofore avowed policy of all parties in interest.

Your board has great confidence in the future of the company; but whether or not that confidence is to be realized depends very much upon whether the policy marked out by the shareholders, during the period of the reorganization or reconstruction of the company, is persisted in. This is a question for the shareholders to decide, not the directors.

The board has heretofore pursued the policy it was understood you had inaugurated, and if a change is to be made it is for you to indicate and direct it. It is but proper here to state that it appears from the stock register of the company, on the date of the closing of the books, that of preferred shares, 58,567 shares are held in America, and 15,874 shares in Europe, and that so far as your board has been able to learn, the American holders who are familiar with the property and its necessities, and with its managers and their policy, have given no indication of any dissatisfaction.

Our attention has been called to a case lately pending in the High Court of Justice, Chancery Division, in England, wherein the Master of the Rolls made an order directing the payment of a dividend to the preferred shareholders in the London Tramways Company (limited). But the question in that case seems to be simply one between the preferred and common shareholders, and does not furnish the necessary light as to how the Master would consider a case similar to our own.

In the case, however, of Corry vs. the Londonderry & Enniskillen Railroad, decided by the Master of the Rolls in 1860, which was very similar to ours, the Master laid down the doctrine fully supporting, as we understand it, the policy we have pursued in the application of our surplus earnings.

Not content, however, with our own examination, we have referred this question to counsel for their advice, and the opinions which have been received in answer to such inquiry are hereto attached.

The opinions referred to are, first, one from the firm of Shipman, Barlow, Larocque & Macfarland, and second, one from W. W. Macfarland. The former says:

"It is for the board to say if and when and what dividends shall be declared and paid to the stockholders out of the profits of any particular year." And the latter says: "For no court undertakes to review the honest decision of a board of directors as to the propriety of declaring a dividend. The directors are, unquestionably, entitled to take into consideration all the wants of the corporation, and to make due provision for supplying them, whether they relate to construction, additions, improvements, or anything else."

The Benefits of the Southwestern Railway Association.

Under date of Nov. 27 Mr. J. W. Midgley, Commissioner of the Southwestern Association, issued to the members the following circular, which will be found of general interest:

For the first time since its inception the Association has this year passed through the busy season without resort to the "sharp" practice of former times. In view of this fact, I beg to submit for consideration the results which have followed. To make the exhibit plain, comparison is made with what might have been expected had there been no Association. From April, 1879, to September ensuing, the roads now forming this Association engaged in a struggle for business. The average earnings during that time were as follows:

Chicago lines, \$2.89 per ton carried, or 7½ mills per ton per mile.

St. Louis lines, \$1.88 per ton carried, or 6 mills per ton per mile.

Hannibal & St. Joseph (about) \$1.70 per ton carried, or 7½ mills per ton per mile.

The effects of this strife were felt long after harmony had been restored. Contracts at rates ruinously low continued to run for months; but, with the exception of a very few, they expired April 30. The remaining few expired July 1.

Meantime trouble arose in the St. Louis Division, during which large quantities of grain were moved regardless of agreement. These "differences" had scarcely been settled when a direct refusal to divert tonnage led to a general reduction of rates. Thus spring was well advanced before the Association attained the steady basis it "has since maintained." The first of May, therefore, marks the period subsequent to which agreed rates have very generally been obtained. From that date to Nov. 1 the movement and results were as follows: The Chicago Division (exclusive of the Wabash) carried 328,394 tons, which yielded \$1,040,149.31; i. e., \$5.73 per ton hauled or 1.15 cents per ton per mile. The Hannibal Division carried 79,560

tons, yielding \$303,133.91; i. e., \$3.91 per ton hauled or 1.73 cents per ton per mile. The St. Louis Division carried 243,413 tons, yielding \$1,040,738.68; i. e., \$4.27 per ton hauled or 1.32 cents per ton per mile. Extend the tonnage moved at the average rate per ton received during the last separation—which rate doubtless would not have been exceeded had there been no association this year—and we should have: Chicago Division, 328,344 tons at \$2.89 per ton=\$977,958.66; whereas the amount received was \$1,940,147.31—a gain of \$962,188.65. Hannibal Division, 77,560 tons at \$1.70 per ton=\$131,852; whereas the amount received was \$303,133.91—a gain of \$171,281.91. St. Louis Division, 243,413 tons, at \$1.88 per ton=\$457,616.44; whereas the amount received was \$1,040,738.68—a gain of \$583,122.24. The total amount thus shown to have been actually gained during the past six months, solely by the maintenance of the Association and the observance of its obligations is \$1,716,593.80. That amount may be distributed among the several lines by extending the tonnage carried by each at the average earnings received during the last contest. It thus appears that in the Chicago Division:

The Chicago & Alton gains.....	\$205,247.03
The Chicago, Burlington & Quincy gains:	
Via Quincy.....	\$250,107.04
Via Hopkins.....	167,279.23
The Chicago, Rock Island & Pacific gains.....	423,470.27
	243,465.35
	\$962,188.65
In the Hannibal Division:	
The Hannibal & St. Joseph gains.....	123,297.92
The Wabash, St. Louis & Pacific gains.....	37,983.99
	171,281.91
In the St. Louis Division:	
The Chicago & Alton gains.....	183,490.85
The Missouri & Pacific gains.....	251,884.63
The Wabash, St. Louis & Pacific gains.....	106,546.76
	583,122.24
Total.....	\$1,716,593.80

These gains are at the rate of \$286,098.80 per month, or \$3,433,185.00 per year!

The foregoing is exclusive of lumber. In that traffic the reduction in rates during the last "war" was comparatively small. It averaged about 7 cents per 100 lbs. below the rates which have since been obtained. During the year ending with September last 384,688 tons of lumber were carried to the Missouri River and beyond. Had this been carried at the rate which prevailed during the last contest it would have made a difference of \$538,500 in the results. Add this to the gains on other traffic, as before demonstrated, and it appears that the actual profits derived from business now covered by the Association approximated \$4,000,000 per year. Nor does this saving, enormous though it be, cover all that is accomplished by means of the Association. There is a large traffic beyond its control, but which is dependent upon the rates which prevail to and from Kansas City. Reference is had to the business of the Iowa pool, to the traffic of the Burlington & Missouri River in Nebraska, to that of the Missouri, Kansas & Texas, and all other lines which cross into Kansas at points south of Pleasant Hill. These outside interests are protected by the Association. The extent of that protection may safely be estimated at \$2,000,000 per year. Then, account should be taken of the protection which every line receives on its local business. The through business to and from the Missouri River is small by comparison with the local business of the roads; but it is not practicable to maintain good rates on local business if the through traffic is carried for little or nothing. Hence, the benefit which most roads derive from the Association is as marked in its bearing upon their local as upon their through traffic. A conflict would involve both. The Association averts this, thereby saving to the roads on their local business as much as it does on the through traffic.

In thus preserving harmony and affording protection at all points affected by it, the Association is capable of saving to the roads in interest an aggregate of \$10,000,000 annually.

Transportation in Congress.

In the House on the 13th:

A bill was introduced to restore to the public domain lands withdrawn for the benefit of the Oregon & California Railroad.

Mr. Crapo, of Massachusetts, introduced a resolution, declaring that the construction of an interoceanic canal connecting the waters of the Atlantic and Pacific Oceans by means of foreign capital under the auspices of or through a charter from any European government is hostile to the established policy of the United States, and cannot be assented to by this government. Referred to the Committee on Foreign Affairs.

Mr. Reagan, of Texas, gave notice that at the conclusion of the pending discussion he would press his inter-state commerce bill.

Mr. McCoid, of Iowa, introduced a bill for the regulation of commerce by railroads between the states and for the better protection of capital invested in railroads, which provides that railroad companies, and all persons operating the same, shall, on or before March 1, 1891, make out and publish schedules of rates, fees and charges for the transportation of persons and freights, which schedules shall be the legal rates, the same as if a part of the act. In such schedules there shall be one uniform charge for loading, unloading and handling, and a uniform mileage rate for hauling per car, whether the shipper uses one or more cars. The bill lays down as the cardinal legal principle to be observed in operating such railroads the performance of impartial public service for fair private profit, and any acts or omissions of such companies, any combination defeating competition, any pooling, drawbacks, rebates, discrimination or failures to furnish facilities to other intersecting or connecting railways, shall be null and void, contrary to public policy and in violation of this act. The bill also contains a penal clause, punishing all such acts in violation of the act, a provision for changes made in schedules upon thirty days' published notice thereof, and a provision for a committee of the House, called the Committee on Supervising Railways, composed of one member from each judicial circuit of the United States, to investigate and report additional safeguards, restrictions and needed legislation, with power to sit in vacation and take testimony as in other cases.

Conductors.

Just as the conductors' excursion train was about to start from Reno Tuesday night, and while the platform was crowded, a man who was not of the party yelled: "I say, conductor!" There were about fifty conductors on the platform. From the force of habit each one answered, and they all sang out in concert: "Oh, damnit! What do you want?" It was a glorious sight to see those fifty conductors swing themselves aboard as the train was pulling out. They all stood about indifferently, as though they were waiting for the train to start; then each would look away from the cars and, carelessly stretching out an arm, would swing on to the train as if the act were entirely unpremeditated and accomplished with no exertion. —*Reno (Nev.) Gazette*.



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CONTENTS.

ILLUSTRATIONS:	Page.	GENERAL RAILROAD NEWS: Page.
The Plattsburgh Bridge...	605, 606, 607	Elections and Appoint-ments..... 674
Signal Diagrams.....	676	Personal..... 675
CONTRIBUTIONS:		Traffic and Earnings..... 675
Experience.....	607	The Scrap Heap..... 676
Ties of Transverse Strength and Resistance to Spike of Various Woods.....	608	Old and New Roads..... 676
EDITORIALS:		Transportation in Con-gress..... 609
Railroad Signals.....	670	ANNUAL REPORTS:
Co-operative Control of the Interchange of Cars.....	671	New York, Lake Erie & Western..... 679
Liability for Damages by R.O.T.....	672	Wilmington & Weldon..... 679
The Cost of Carrying Passengers.....	672	Wilmington, Columbia & Augusta..... 680
Average Train Loads.....	672	Cairo & St. Louis..... 680
Grain Exports.....	673	New York, Providence & Boston..... 680
Empire and Earnings on Illinois Railroads.....	673	MISCELLANEOUS:
Record of New Railroad Construction.....	673	The Plattsburgh Bridge..... 605
EDITORIAL NOTES.....	673	The Rights of Holders of Preferred Stock..... 608
GENERAL RAILROAD NEWS: Meetings and Announcements.....	674	The Benefits of the South-western Railway Association..... 609

EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

RAILROAD SIGNALS.

In its generic meaning, Webster says, language denotes any mode of conveying ideas. Signals therefore form a language for railroads, and are the means of communicating information of the utmost importance, on which life or death and the safety of many persons are often dependent. For the purposes which it is intended to perform it would seem then that above all things this language should be definite, uniform and unmistakable. The ideas which must be conveyed by it are of the simplest kind, and the language may be equally so. In fact, there are but two or at most three different ideas that must be conveyed from those giving the signals to those who observe and are guided by them. These are "go ahead" and "stop," and, in some cases, "go ahead cautiously." It happens sometimes that by association very simple ideas appear to us complex. This seems to be the case with railroad signals. Thus the causes which lie back of the message which a signal-man must give and the locomotive-runner obey are of the most involved and intricate character, although the instructions which should be given are of the plainest kind. Thus the tender of a draw-bridge if a vessel approaches must first display a signal of danger, then swing the enormous structure to leave the stream open for the passage of the vessel. This accomplished, the bridge must be swung back again, the continuity of the track restored and the bridge locked so that it cannot be disturbed after it is closed. At a junction of two roads the signal-man must know that the track is unobstructed by other vehicles and that the switches are placed in the proper position, so that the main line is clear for the passage of an approaching train. At a crossing approaching trains in one direction must be stopped, and the other line kept open for trains to pass. At a signal station the signal-man

must be able to tell whether the preceding train is out of the way of the following one, or, on a single-track railroad, whether there is one approaching in the opposite direction to that of the train which is about



Fig. 1.

to leave. If an engine breaks down on the line, the first thing to do is to notify following trains.

Although there is great diversity in these circumstances which make it necessary to signal to locomo-

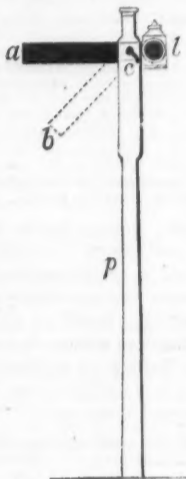


Fig. 2.

tive-runners, yet the idea to be conveyed in all cases is the same, and is either to "stop" or "go ahead."

Supposing that instead of conveying these ideas by signals it was done by the display of a lettered

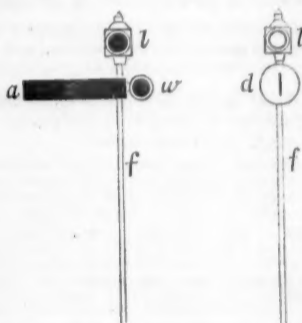


Fig. 3.

Fig. 4.

sign, and that to stop a train at a railroad crossing the word "halt" was displayed, at a draw-bridge "stand still," at a junction "hold on," at a switch "stay," at a road crossing "pause,"

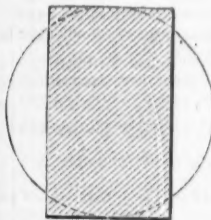


Fig. 5.

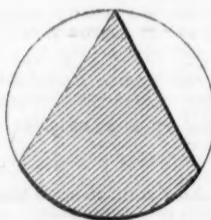


Fig. 6.

and at a signal station "rest"; and that when a train was to go ahead the words "forward," "advance," "proceed," "come on," and "line clear" were displayed at different places respectively, it would at once appear absurd, because the message in all these cases is intended to mean the same thing. Suppose, though, that this same system of signaling by lettered signs was in vogue on different roads, and that on one they used English terms, on others German, French,

Spanish or Italian, every one would at once say that, considering the momentous importance of the messages to be communicated, such practice was not only absurd, but considering the danger of mistaking or misunderstanding those words, that continuing such a system was very culpable; yet as a matter of fact, different sign languages are now used for signaling on many of our lines.

Perhaps, though, still harsher language would be used if such a system was employed, and the letters on the signs were of a size, form or color that is difficult to discern at the required distance, or in certain conditions of the atmosphere. Yet an exactly analogous condition of things now exists on our railroads. There is hardly a line in the country on which there are not different signals for junctions, crossings, draw-bridges, switches and stations, besides, in many cases, a variety in the kinds used for these localities; and this diversity is often advocated and generally supported by those who have charge of such matters on different railroad lines.

Let us suppose that a system of day signals, such as has been indicated, was in use, and that it was proposed to make them uniform by adopting two common words for all localities, and at all times, when a train is to be signaled to "stop" or "go ahead." There can be no doubt that if such a hypothetical condition of things existed the more inert and conservative railroad managers would very generally oppose such a change, and be ready to argue that there are special reasons why "stop" should be used at junctions, "halt" at crossings, "stay" at draw-bridges, "hold on" at switches and "pause" at stations. Let it be supposed, though, that such a system was in use in daytime, but that it was found difficult at night to display the different words so that they could be distinguished, and, therefore, the words "stop" and "go ahead" were used for all places when such signals must be given, because they could be seen easier than the others—would not the question arise at once, if these two signals will answer for all localities at night, why can they not be used in daytime in place of all the others?

Now, if any one will reflect on the condition of things as they exist now, they must see that on nearly all roads a multimodal system of signals is in use in daytime, and that although a different word is not employed to convey the message of "stop" or "go ahead," a different form of signal is used, whereas at night but two or sometimes three signals are adopted in all places where they are required. These are a red light, which means "stop," and a white light, which means "go ahead." In some cases green or blue lights are used in addition, which indicate caution. The question might then be put as before: if a road can be operated at night with only two signals, why are so many different ones needed in daytime? A signal should mean one of two things, and only one of two things, that is, either the line is clear, and therefore the signal should be "go ahead," or the line is not clear, therefore "stop." A caution signal means, "I am not quite sure whether the line is clear, but you may go ahead carefully." Of the danger of this on crowded lines, with trains running at a high rate of speed, it is not necessary to speak, but on roads with a light traffic, it may be employed with advantage and with comparatively little danger. If main-line signals should have this definiteness, it is difficult to see why such a variety of forms should be used to convey the same message. In fact, at night there is no such variety, which proves conclusively that it is not necessary.

Inasmuch as a danger or "stop" signal always means the same thing, and is definite and peremptory, it is difficult to see why it should be conveyed by different means. It would seem as though its mandatory character would be much more emphasized if it were always expressed in the same way. It is very doubtful if a commander of troops could have his orders obeyed with the same promptness, if at one time he shouted, "stop," and at others "hold on," "stay," "pause," or "stand still," as he can if the command is uniformly "halt." In the same way, a variety of visual signals is liable to create confusion, hesitation, doubt or mistakes. We have no data or definite information to base an opinion on, but venture the assertion that a signal of a red light at night is observed and obeyed with much more promptness than a switch target, or any of the great number of disk signals in use.

If it then appears to be desirable to adopt a uniform signal to be used in daytime for all trains running on main lines, we must consider which is the best one to select, and whether it should be distinguished by its color or its form. There can be no doubt that in some positions and conditions of

light and air it is very difficult for persons who are in no degree color-blind to discern the color of a signal at a distance. Of course, if it is distinguished by its color alone, whatever danger may be due to the inability of the observer to perceive color will be incurred. The advantage in every way of signals whose meaning is determined by their position has often been pointed out. Inasmuch, though, as there is no reason why signals may not indicate by both color and position, the decision that both should be used is the obvious answer to the question. The colors to be used and their meaning have in a great measure been determined by common and general practice, so that the question of form and position is the only one to be considered.

There is, as every one knows, a language of position, attitude or gesture, which is sometimes much more expressive than words, and in common life the message of "stop" which a signal-man must communicate to a locomotive-runner is often thus expressed. Thus, if a person is about leaving a room and another wants to detain him, what is more natural than for the first to extend the arm as indicated in fig. 1. There is a natural significance in this which we all recognize. Now, by what may be regarded as a curious coincidence, but which probably has more of the character of cause and effect, the semaphore signal, fig. 2, which is now most generally used in Europe, and which, as stated in Barry's excellent little book on "Railway Appliances," "has been found so superior to all other types that it is rapidly superseding all other signals, and before long it will probably be the only daylight fixed signal in use in England," resembles in outline very closely that of a man standing erect and his extended with the gesture meaning "stop." There is therefore a natural significance which attaches to this form of signal which attracts attention more quickly than any other, and it is the universal opinion of all who have taken the pains to observe that it can be discerned at a greater distance than any other form of equal superficial area. It consists simply of a post, *p*, of any convenient or desirable height, with an arm or board, *a*, about 10 or 12 in. wide and 5 or 6 ft. long, pivoted at *c*, so that it can be moved out at right-angles to the post, as shown in the figure. It is operated by a crank, shown at *e*, which is connected by a rod with suitable mechanism at the base, which is not shown in the figure. By this means the arm *a* can be raised up into the position shown, which means "stop," and be lowered so as to be entirely hid by the post, and then means "go ahead." If a caution signal is required, it can be placed at an angle of 45 degrees, as indicated at *b* by the dotted lines. The arm *a* can, of course, be painted red, so that the meaning will be indicated by both position and color. At night a lamp, *l*, is placed either back of the arm or in any other convenient position, and a red glass or lens is arranged in front of it, so that it is operated by the same mechanism that moves the arm *a*.

Those not familiar with the construction of signals of this kind are referred to the *Railroad Gazette* of Oct. 4, 1878, in which very complete engravings were published. These represent some designed by Messrs. Saxby & Farmer, the celebrated English manufacturers of such apparatus. The purpose of the present article is to point out the adaptability of this form for what may be called a universal daylight main-line signal. They can be used in all positions where main-line signals are required. At junctions, crossings, draw-bridges and similar places, they can be mounted on posts of suitable height—the one represented is about 20 feet. If it is desired to emphasize them, as it were, at important or very dangerous points, they could, of course, be made of greater size than at other places which are considered less dangerous. At stations they can be attached to the building and operated by a rope or rod by the telegraph operator from the inside. For switches it will sometimes be more convenient to attach them to a vertical revolving shaft, in the same way as ordinary targets are attached, and as shown in figs. 3 and 4. In the former, *a* is the semaphore arm, made of sheet iron or wood painted red, with a cast-iron counterweight, *w*, attached to the back side to balance it, both being fastened to the shaft *f*. The counterweight is added because when such signals are not balanced they very soon draw the shaft and the switch-stand "out of plumb," as may be seen at any time on the New York & New Haven Railroad. Attached to the same shaft, and at right-angles to the arm, *a*, *w*, is a circular disk, *d*, fig. 4, about two feet in diameter, which may be painted white. It is assumed, of course, that in moving the switch the shaft *f* makes a quarter turn, which, when the switch is set for the main track, displays the disk *d* to the locomotive-runner, and when set for a side-track shows the arm *a*.

If semaphores of this kind were used for all main-

line signals, it would be possible to adopt the rule that *no engine or train should ever pass one of them when extended at right angles to the post*. In other words, that such a signal should have the same significance as a red light at night, and should *always* mean "stop." Such a system would be much more definite, simple and imperative than the diversity which now exists, and which must often be perplexing, and for these reasons it would be safer.

On double-track roads semaphore signals are placed on opposite sides of the post, and trains in each direction observe only those on the left side.

It might not be amiss before closing this article to call attention to the manner of attaching signal lamps to switch stands, in which great carelessness is often shown. Usually the lamps are attached to the upper end of the switch-stand shaft *f* by a socket on the lamp, the shaft being made square to receive it and to prevent it from turning. In such a case it is evident that the lamp may be placed in any one of four positions, and that through inadvertence or carelessness the lamp can be placed on so as to show an "all-right" signal when in fact the switch is all wrong. To avoid this, if the opposite sides of the lamp are alike, the shaft and socket, instead of being made square are made oblong, as shown in fig. 5. The lamp can then be put on in only two different positions; that is, it may be reversed, but cannot be placed at right-angles to its proper position. If the opposite sides of the lamps are not alike, the end of the shaft and the socket should be made somewhat like the form shown in fig. 6, which will permit the lamp to be placed in only one position. Although this is the very *a, b, c* of signalling, yet on one of the main lines of this country all the lamps are attached to the switch-stands with square sockets.

It was stated in the beginning of this article that one language of signals is used on one road and quite a different one on others. The desirable thing, of course, is to bring about uniformity. It is difficult to see how this can be done unless the managers of different lines can be made to see the superiority of some one system. Should they be induced to investigate the advantages of the semaphore system, it is believed that in this country, as in Europe, its superiority over all others would secure its universal adoption.

Co-operative Control of the Interchange of Cars.

In every time of general activity of traffic and consequent scarcity of rolling stock, it is a common complaint of railroad companies that their connections or their connections' connections are extremely dilatory in returning their cars; that if they do not keep them for local traffic (and this is a common charge) they give preference to their own cars or to others in which they have interest in the matter of prompt unloading and return. It being necessary to delay some cars, the road on which the delay occurs takes special pains to keep its own cars running and earning money, and lets the loss, as far as possible, fall on the companies whose cars are on its road. Part of this is the result of a vicious system which takes account of mileage only, as the basis for payment for the use of cars, and which provides no check for the owner of the car when it is off his own road, and Mr. Davies' system of daily reports, and the system of the New England Car Association are intended to provide the latter. But, in addition to this, there is not infrequently a positive wastage of car service by restricting cars to certain routes, on which no freight may happen to offer in one direction, when by another route they might get loads. That is, the car is made to go back empty by its own road, when it might go back loaded by some parallel route. In endeavoring to provide a method of keeping a fair account that will protect the interests of the owners of the cars, it may be well to inquire if some plan cannot be devised by which this account may be kept with perfect accuracy and fairness, and at the same time and through the same instrumentality some supervision in behalf of a road be exercised over its cars while on foreign roads. The supervision would probably have to be exercised by proxy, and the following plan is offered for the consideration of all the readers of the *Railroad Gazette* that are interested in the subject of car service, not that it is thought that the plan is something new or that it is perfect in all its points, but because it is believed it is superior to the present system (?), and, though it might require some modifications, it could be adopted and carried into effect with advantage to all parties identified with it. The plan is to form a co-operative association among the railroads to act as their agent in relation to all matters appertaining to car service. This association could be formed after the model of the fast freight lines, and be governed by a board of directors

consisting of one representative from each road in the association. Every road should be required to send daily reports of the movement of all cars over the road, and send a daily junction report for every junction. Every outside road should also be required to conform to the above rule. If the association included among its members the more important roads, the above rule would probably be complied with by all parties. Subordinate offices should be located at convenient points for the greater facility of operation; these subordinate offices could report to the general or head office weekly or monthly, as may be preferable. Monthly statements to be rendered, every individual road showing amounts due from and to it for car mileage during the month, and the balance in its favor or against it. If the balance was in favor of the road it could draw on the Treasurer of the association for the amount of same, and if the balance was against it the Treasurer could draw on the road. This would simplify, if not entirely dispense with, the road keeping any car accounts, excepting for its own convenience or for the movement of its own business. Again, the association could act as the agent of the individual roads in relation to all matters concerning their cars while on foreign roads. It could be delegated the power to order any car home when it considered it had been kept off the road for an unreasonable time; it could be authorized to investigate all cases of unusual detention. And it could be made the distributing agency for all cars that were allotted to common business. Through the medium of frequent and quick communication with its subordinate offices, if empowered to act in the matter, it would be enabled to distribute cars to meet the demands of traffic much better than they are met at present. If a certain number of cars were furnished by the various roads and placed under the control of the officers of the association, and they were given the authority to send them to any point where they might be needed and use them for the transportation of any freight for which they might be required, regardless of the route by which the freight might be forwarded, they would be able to get more service from the cars and avoid considerable hauling of empty cars. Take, for instance, an Eastern road, that may have fifty cars of freight to be forwarded via the Great Western road to Chicago. It may have at its command fifty Red and White Line cars that it would have to return empty, but under the present rules it is not permitted to ship the freight in those cars, but must procure the proper cars as best it may, even if it has to haul them empty the entire length of the road, and if it cannot procure other freight that can be forwarded west over the prescribed route for the Red and White Line cars it must return those cars empty. Under the present order of things there is nothing unjust about this. The cars are owned by the roads in these lines and furnished to accommodate the business over these lines alone; but, if these cars were held subject to the control of the proposed association, in the case referred to, there would have been avoided the haul of quite a number of empty cars. The claim that if so great powers were placed in the hands of the managers and officers of the association they would be likely to abuse it and give a decided preference to their favorite roads can hardly be sustained. The managers and officers would be appointed by the directors or trustees, consisting of delegates from every road in the association, and as their term of office would depend upon their giving satisfaction to their employers, they would be very careful to use the strictest impartiality and by every possible means endeavor not to give offense to any road in the association. If any road desired its cars returned to it, instead of sending car-tracers to the immediate connection to which it delivered the cars, and have the tracers follow the cars from one road to the other until some lazy clerk pigeon-holed them, thereby necessitating the road to start out a fresh tracer, it would be only necessary for the road to send the list to an office of the association with the request that the cars be sent home. Then it would become the duty of the association to locate them, which it could easily do from the daily reports. It could then order the cars home, and from the daily reports would also be able to see that its orders were promptly obeyed. It often occurs that at competitive points a road is at the mercy of the shippers, and has to act in a very conciliatory manner, and while it is aware that the privilege of holding cars is abused by shippers, it is not in a position to press the matter, for any prompt action on its part would be met by the shippers giving their patronage to a competing road. Here the association could be made a very effective instrument in bringing shippers to terms, especially if the competing road

was also a member of the association. The officers of the association could require that the cars be not detained, and as the association in its corporate form would not be engaged in the transportation of freight, shippers could not punish it in that way, and if they carried their patronage to the other road they would still be under its jurisdiction. Many other advantages that would be secured by the formation of an association of this kind by the principal roads could be enumerated, but the above are sufficient to indicate that the plan would, in many ways, be preferable to the present system of car interchanges. While the foregoing may be conceded, many may object on the grounds that the machinery for carrying on the business of the association would be very expensive.

Beyond a doubt it would cost considerable money, but it must be remembered that the association would perform a great portion of the work that is now performed by the car-accounting department of each road; consequently the reduction of expenses on every road for this department should be placed against the cost of operating the association. This would materially reduce the expense of the proposed plan, and it is thought by the advocates of an association that the increased earnings that would result from the adoption of this plan, or rather the increased service that it would be possible to get from the cars, would not only counter-balance all the expenses, but would show a handsome profit to sustain the wisdom of the policy advocated.

Liabilities for Injuries by Riot.

Until recently the question of the liability of companies for mischief done by mobs or rioters, attracted but little attention. It might well be classed among subjects involved in uncertainty. There is, indeed, in many of the states, a tolerably distinct rule that a city or county is liable for property destroyed by a mob within its limits. But this rule has no fair application to property in charge of a railroad company for transportation. It is founded on the view that the municipality has neglected its duty of preserving the peace and maintaining order. Any liability of a railroad company must be deduced from its contract or public duty as a common carrier; and there have been, hitherto, few occasions raising the question. Recently, however, suits brought by shippers of goods destroyed by the Pittsburgh riots of 1877 have reached decision. What has been said in these cases, with what little was declared previously, renders it practicable to give a somewhat connected sketch of the progress of thought in the courts on the liability for injuries by riot.

The simplest aspect of the question is whether rioters are "public enemies." Suppose there has not been, in the particular contract for transportation, any limitation of the company's undertaking, but it stands liable, fully, as a common carrier—responsible for all causes of damage, except the act of God or the public enemy. Thus far the courts say that an insurrection or mob, no matter how violent, extensive or long continued it may be, is not a "public enemy." One of these cases arose out of the riot in Indiana, upon the line of the Pittsburgh, Cincinnati & St. Louis Railway, during the close of 1878. From Christmas day a mob sought to enforce their side of the quarrel with the company by lawless violence, and with clubs, stones and fire-arms they drove the engineers and firemen away from the locomotives and rendered the running of trains impossible. They were so numerous and violent that the civil authorities were not able to suppress the disturbance. The military were called out, by whom, at last, the rioters were vanquished; but this was not accomplished until Jan. 3. The circumstances of the Pittsburgh riots of 1877 were even more aggravated. The Pennsylvania Railroad Company, finding itself unable to protect the property in its charge, applied to the sheriff for protection; the sheriff made requisition upon the Governor for a military force; troops were called out, but failed, in the first conflict, to suppress the mob; and the rioters then, in revenge, burned the merchandise in question. In both cases the fact was clearly shown that military measures were necessary; and the argument for the company was that when a riot assumes such proportions as to require the services of the troops to restore order, it becomes in a just sense a public enemy. But the decision was that by "public enemy" is meant pirates at sea, or the forces of a foreign government at war with the United States. Rioters and insurrectionists are classed with robbers and thieves, not among public enemies; and though their multitude should be irresistible, the common carrier is nevertheless chargeable. The hardship which such a rule may cause, nay, has caused, in many cases might well induce the Legislature to enact a change.

Suppose the merchandise has been received under

stipulations limiting the company's liability. This was so in two of the cases. The railroad receipt given provided that the company should not be liable for loss by fire, except, of course, if it were caused by negligence chargeable to the company; and the goods were burned by the mob. The courts said that accepting the receipt containing this stipulation threw upon the owner of the goods the duty of proving negligence of the company or its servants, causing the fire; and that this must be some substantial neglect of proper precautions; an involuntary or technical default would not warrant holding the company liable on this ground. The interruption of the journey by reason of refusal of some of the company's servants to perform their duties in running the freight trains, by which the goods were kept delayed at Pittsburgh until the mob was provoked to burn them, although technically a fault imputable to the company, was not the sort of negligence which the rule means. The counsel for the owners of the goods argued that the company, by suffering the goods to be detained, by failing to prevent the rioters from obtaining possession of them, and by allowing other cars loaded with petroleum, which the rioters afterward used in burning the property, to tarry in the vicinity, put it in their power to destroy the goods; for, if the transportation had been duly made, the plaintiff's goods would have been far beyond reach before the day of the fire. But the Court pronounced against this argument, because the evidence showed that the rioters were in overwhelming force, and that the company was practically disabled from forwarding the goods punctually.

What effect, if any, is attributable to the fact that the riot commenced in a strike of the company's employes? In an Illinois case the brakemen employed by the Pittsburgh, Fort Wayne & Chicago Railway Company struck work. They were promptly discharged, and other brakemen employed in their places. The discharged brakemen then gathered a mob of malcontents in the neighborhood to assist them, and the whole riotous force broke up the running of trains for several days. A quantity of cheese was by this means detained, and during the delay a cold snap occurred and the cheese was frozen and ruined. For the owner it was argued that here the damage was caused by the misconduct of the company's brakemen, and that the company was responsible that the brakemen should perform their duty. The Court said that this is true as respects brakemen while they are employed, but that the responsibility terminates when the men are discharged; after that time they stand in the position of strangers. If in this case the brakemen had refused to work, and, pending negotiations or discussions with them while they were continued in their positions, the cheese had been frozen, the company could not have excused itself by saying that the train could not be run on time on account of the difficulty with the brakemen. But it was not chargeable with fault in respect to the delay which the men caused after they were discharged. Even if the Court should be of the opinion that the strike was caused by insufficiency of wages, and should consider the company remotely in fault for not paying the men reasonably, this (as one of the cases says), as it does not justify riot on the part of the men, so it does not prevent the riot from being an excuse to the company for the delay.

In respect to mere delay in receiving and forwarding goods, a distinction is taken which may be of value to a company. The common law liability for all losses, except those caused by the act of God or the public enemy, does not attach until the carrier has accepted the goods. Prior to that time he is, to be sure, bound in a general sense to accept and carry all goods offered; but the existence of a riot along the line, although it is not an excuse for destruction of the goods if the company has taken them in charge, yet it is a defence for the refusal to receive them. The evident reason is that the refusal leaves the goods in the owner's charge, who can himself take such measures for their safety as he thinks proper. If, therefore, a traffic agent, notified of riotous obstructions to the trains, has sufficient forethought to refuse to take freight or to forward it until the trouble is over, he may thus, at least according to the only case affecting that point, protect the company.

None of the recent decisions involved the question of injuries to passengers. Upon this branch the weight of past decisions is that a railroad company is chargeable with taking every reasonable and practicable precaution for protection of each passenger from violence by his fellow passengers, and still more by employes. But for mob violence committed by outsiders—by persons whom the railroad corporation has not admitted to the cars, but who have burst their way in by lawless force—the company is not responsible; this is one of the risks which passengers take. Several

instances of this doctrine have formerly been mentioned in the *Railroad Gazette*.

The Cost of Carrying Passengers.

The efforts sometimes made to calculate the cost of transportation are often ludicrous, though seriously made. One of the latest is given in the *Buffalo Express*, as follows:

"Here in New York we have the lowest rates in the country—two cents a mile, but how very high that is compared to freight rates! Through freight is carried at about half a cent per mile per ton. It takes 15 people to weigh a ton, and it costs, on the cheapest passenger road in the country, the New York Central, 30 cents a mile to haul a ton of people, or 60 times as much as to haul a ton of coarse freight. On a 5-cents a mile road the passengers are charged 150 times as much as the freight. Of course it costs the railroad companies more to transport the passengers than the freight, but not 150 times more, and not 60 times more. Let us put it another way: Eighty passengers can ride in a car. They pay \$1.60 on the Central and \$4 on the Southern roads per mile for transportation. The ordinary load of a freight car is 10 tons. It pays 5 cents for each mile of transportation. It, of course, costs more to haul a passenger car at a rapid rate than a freight car at a slow rate, but it does not cost 80 times more, nor even 32 times more. If a railroad can make money by transporting freight at half a cent per ton per mile—and the reports prove that it has been done—then they certainly ought to make money by transporting passengers at 1 cent per mile, which would be 16 times as much for hauling a loaded passenger car, the load of which would be only 6 tons, as for hauling a freight car with a load of 10 tons."

Charges have to be based not on what a train *can* haul, but on what it *does* haul, or the average load it is able to get. The *Express* gives 80 as a car-load: the number that can be seated is usually not more than 56 in an ordinary car, weighing at least fifteen tons, and 25 in a parlor or sleeping car, weighing 20 to 25 tons. But passenger trains cannot be held until there are tickets enough sold to fill a train full. They must be run at regular intervals and at several different hours in the day. There are probably very few passenger trains on the New York Central road that have as few as four cars, and some have twelve or fourteen. Doubtless most people suppose that a New York Central train carries on the average two or three hundred passengers. Now the actual average load in 1878-79 was 60.1, and the year before 61.4, and this our examination of railroad reports shows to be something above the average of American railroads. Now this puts a different phase on the matter at once. The capacity of cars has nothing to do with the cost per passenger, it is the *train-load* and not the *car-load* that is important. Now the passenger train with its small load usually requires the whole power of the locomotive about as much as the freight train with its large load, because the passenger train runs faster, and moreover the load of the engine is not the passenger or freight alone, but these plus the *cars*. Now the New York Central's average weight of cars in a passenger train is estimated in its report as 110 tons, which gives 1½ tons of *car* hauled per passenger; but it reports likewise about 2¼ tons of *car* hauled per ton of freight—say 2 tons of *car* and load hauled per passenger and 3¼ tons of *car* and load hauled per ton of freight. With the slower speed of freight trains the same engine will probably be able to draw two or three times the weight it could haul at passenger train speed. Thus the difference between the *load* imposed by carrying a passenger and that by carrying a ton of freight is very different from what the *Express* puts it. If every train went loaded to the full capacity of the cars and engine, it would still cost more to carry a passenger than a ton of freight, unless the passenger train were to run very slow. This, however, hardly enters into the calculation of the cost, because, as we have said, it is the average actual load, and not the possible load, that determines, and the average passenger-train load as we have seen, is but a small fraction of the possible one.

The smallness of passenger train-loads is a universal experience, so far as our investigations extend, and they cover the traffic of France, Belgium and Germany, in two of which countries the *average* passenger rate is much lower than here, and in which the lowest class is carried for about a cent a mile. It is a prevailing complaint in Europe that passenger traffic is not profitable. In Germany it seems to be almost universally admitted that the expenses fully equal the receipts of passenger business, and by the government roads as much as by any. There are doubtless numerous exceptions, and these will be found chiefly where peculiar circumstances make it possible to secure large average train loads. Usually the road that has the heaviest passenger traffic is compelled to run several trains which do not more than pay expenses. It may make large profits on some trains, but divided over the whole traffic passenger profits on most roads in this country are light. Several roads that divide passenger and freight expenses have shown passenger expenses in excess of the earnings. But if any way can be contrived of increasing the average passenger-train loads, the rates might be reduced. With an average of 100—not quite two cars full—probably a charge of 1½ cents a mile in New York would pay, but no country in the world that we know of has such an average train load.

Average Train-Loads.

Average train-loads have been the subject of a good deal of investigation and discussion in these columns for some years past, and in an article on "Erie Traffic and Expenses" two weeks ago, we compared the average freight-train loads of several leading railroads. A gentleman familiar with the business of the Pittsburgh, Fort Wayne & Chicago Railway has written to us that the train-load given in this article for

that road in 1879 (120.1 tons) is much too small, but that it was actually 164.5 tons. But in this connection he says "of course this excludes empty mileage." This leads us to fear that others also may have mistaken the meaning of the "average train-load," as we give it. We ascertain it for freight trains by dividing the total tonnage mileage by the total freight-train mileage, so that a freight train carrying 800 tons over the whole length of a road in one direction and returning entirely empty gives an average load of 150 tons. This is the actual average load. Of course it depends upon many things besides the power of locomotives and the grades and condition of roads; one of the chief elements being the evenness of freight in the two directions, and another the proportion of through freight. In these and almost all other comparisons of results attained on different railroads, it will not do to draw conclusions as to the economy or skill practiced without a pretty intimate knowledge of all the circumstances. A road with even traffic in both directions has an advantage quite similar to that of a road without grades or curves. Either may be worked at a low cost per unit of traffic without any particular credit to its managers, and a road in the best condition, with the most powerful and economical motive power and the greatest skill in superintendence, may show much lighter average loads and higher cost per ton and per passenger per mile, because nearly all its traffic is in one direction, or on unfavorable grades. But we should not on this account conclude that the comparisons of train-loads are valueless. They are not of themselves a sufficient criterion, but they are one of the elements, and a principal one, from which we can judge. When we find that a road has an unusually light or unusually heavy average train-load, we are led to inquire the cause. Grades and balance of traffic may account for part or the whole of it, and again they may not, and we may find it in effective or ineffective motive power, skill or lack of skill in conducting transportation. And frequently the comparison of average train-loads on the same road in different years is more significant than on different roads. Here the balance of traffic may change greatly, or the method of conducting transportation may immensely change the average loads. A striking example is that which we have often referred to—the recent practice of carrying anthracite coal west in grain cars instead of coal cars. On the average there are about four tons of freight hauled east to one hauled west on the trunk lines. But, in spite of this, a few years ago (and still to some extent) whole trains were sent east empty. Anthracite coal was delivered in coal cars by the coal roads to such lines as the Philadelphia & Erie and the Erie, and by them hauled to Buffalo or Erie, where they were generally dumped, and the cars hauled back empty because there was (and is) no considerable east-bound freight fit to be carried in coal cars. Now to a very great extent the box cars which have carried freight from the west to New York or Philadelphia, for only a small part of which west-bound freights can be obtained at those cities, are sent first to the coal mines near by and loaded with coal, and then hauled west loaded. A further effect of this practice is to cause a very considerable portion of the shipments of anthracite to the West to go through by rail, instead of being unloaded at Buffalo or Erie and forwarded by lake vessels, which usually get from 25 to 50 cents a ton for carrying this freight to Chicago. The roads west of Buffalo must take the cars back at all events, and they can better afford to take them with the coal in them for a very small rate than to take them empty for nothing. In this way, with the same roads and precisely the same motive power, average train-loads may be increased greatly, and this change has doubtless had much to do with the striking increase of late years on the Michigan Central and the Lake Shore, as well as on roads further east. In this case it was due to an improvement in management, and could never have been explained by investigating the motive power or the grades and curves of the roads, or even the amount of traffic in the two directions.

Grain Exports.

For the eleven months from Jan. 1 to Dec. 4 the exports of flour, wheat and corn from New York, Baltimore, Philadelphia and Chicago have been, flour in barrels and grain in bushels:

	1880.	1879.	Inc. or Dec.	P. c.
<i>Flour:</i>				
New York.....	3,755,530	3,984,055	D. 228,525	5.7
Boston.....	981,611	709,473	I. 272,138	38.4
Philadelphia.....	252,035	144,892	I. 107,143	74.0
Baltimore.....	455,595	409,592	I. 46,003	11.3
Total.....	5,444,771	5,248,012	I. 196,759	3.7
<i>Wheat:</i>				
New York.....	59,094,860	60,442,178	D. 1,347,318	2.2
Boston.....	3,051,412	4,628,061	D. 1,476,649	32.6
Philadelphia.....	10,656,626	16,603,800	D. 5,947,240	35.8
Baltimore.....	30,839,619	30,402,908	I. 376,711	1.2
Total.....	103,642,517	112,037,007	D. 8,394,490	7.5
<i>Corn:</i>				
New York.....	48,548,322	33,652,888	I. 14,895,434	44.2
Boston.....	10,870,747	6,394,121	I. 4,476,626	70.1
Philadelphia.....	15,576,684	13,508,942	I. 2,067,742	17.0
Baltimore.....	14,962,970	19,507,065	D. 4,544,095	27.9
Total.....	89,964,923	72,863,016	I. 16,201,907	22.2

New York has always had a much larger proportion of the flour than of the other exports, but this year, though there is a small gain in the total flour exports of the four ports, there is a decrease at New York, more than balanced by a very large increase at Boston, which always has had a larger share of the flour trade than any other port except New York. The flour business of the other two ports, though it has grown, is still insignificant. The two together exported but 13 per cent. of the whole this year and 10.8 last year. Boston this year has exported 13 per cent. of the whole—much more

than of any grain. As to wheat and corn, it appears that there has been a decrease of 7.5 per cent. in the aggregate exports of wheat, and a decrease everywhere except at Baltimore, where there has been a slight increase; while exactly the contrary is true of corn—namely, an increase (22.2 per cent.) in the aggregate, and an increase everywhere except Baltimore, where there is a large decrease (27.9 per cent.). New York's wheat exports are nearly the same as last year; its corn exports nearly 15,000,000 bushels, or 44.2 per cent., greater. The gain at Boston has been no less than 70 per cent. Below the percentage of the total exports of each staple from each port is given for both years:

	Flour.		Wheat.		Corn.	
	1880.	1879.	1880.	1879.	1880.	1879.
New York.....	69.0	75.9	57.0	54.0	54.6	46.2
Boston.....	18.0	13.5	3.0	4.0	12.1	8.8
Philadelphia.....	4.6	2.8	10.3	14.8	17.5	18.3
Baltimore.....	8.4	7.8	29.7	27.2	15.8	26.7

Taking the cities in pairs, we have the following as their percentages in the two years:

	Flour.		Wheat.		Corn.	
	1880.	1879.	1880.	1879.	1880.	1879.
New York and Boston.	87.0	89.4	60.0	58.0	66.7	55.0
Philadelphia and Baltimore.....	13.0	10.6	40.0	42.0	33.3	45.0

In everything except flour, then (which is but one-eighth of the whole in equivalent bushels, and but about one-eleventh in weight) the two northern cities have gained. Reducing flour to wheat, on the conventional basis of five bushels to the barrel, we have the exports of the four cities for the eleven months:

	1880.	1879.	Inc. or Dec.	P. c.
New York.....	126,421,032	114,015,341	I. 12,405,691	10.9
Boston.....	18,836,214	14,470,147	I. 4,366,067	30.2
Philadelphia.....	27,493,485	30,637,392	D. 3,143,777	10.3
Baltimore.....	47,180,504	52,017,933	D. 4,837,369	9.3
Total.....	219,931,235	211,140,813	I. 8,790,422	4.2

The total gain of 8,790,000 bushels is made up of a gain of 16,770,000 bushels at the two northern ports and a loss of 7,980,000 at the two southern ones.

Just contrary to what was the case only a few years ago, Baltimore seems to depend chiefly on the wheat traffic, while the corn is commended to a much greater extent than formerly by New York and Boston. This, we imagine, is largely due to the revolution in agriculture in the Ohio valley that we have heretofore mentioned, namely, the increased production of winter wheat of late years. This has not been effected without devoting to wheat land that would otherwise have been cultivated in other crops, and especially in corn, which was (and still remains) the great crop of the Ohio valley. The farmers who have more wheat to sell, have generally less corn to sell, and it is from this valley that Baltimore chiefly and Philadelphia largely draw the grain they receive and export; thus the coincidence of an increase in wheat and a decrease in corn at those ports is explained.

Employees and Earnings on Illinois Railroads.

From the returns of railroads to the Illinois Railroad Commission, which includes the average number of employees during the year—information not usually attainable—we are able to give the following statement of number of employees per mile of road, and amount of gross and net earnings per employee, on a large number of roads:

	NO. EMPLOYEES.			EARNINGS PER EMPLOYEE.		
	Total.	Per mile.	Per loco-mile.	Gross.	Net.	
Chicago & North-western.....	8,457	5.0	26.7	\$9,554	\$7,910	\$1,069
Chicago & Grand Trunk.....	1,238	3.8	22.1	2,720	751	118
Chic. & Burl. & Quincy.....	11,507	7.3	30.8	10,433	1,427	727
Chic. & Mil. & St. Pau.....	10,824	3.6	31.5	3,808	1,057	466
Chic. & Rock I. & Pacific.....	6,742	5.5	24.7	9,652	1,762	850
Illinois Central.....	3,777	2.9	17.7	5,698	1,944	915
Lake Shore & Mich. Southern.....	9,292	7.9	18.8	14,938	1,893	859
Michigan Central.....	5,052	6.3	23.1	10,612	1,689	638
Wabash, St. L. & Pac.....	8,064	4.7	27.4	5,827	1,250	412

We are not always sure, in these reports, of the data. The mileage given in some cases may be that owned simply, and not the whole mileage worked and on which the whole force is employed. And in some cases income other than that from transportation may be included in gross and net earnings.

It will be noticed that the number of employees per locomotive varies less than the number per mile of road, which was to be expected. Still, the number per locomotive varies from 17.7 (Illinois Central) to 31.5 (Chicago, Milwaukee & St. Paul). A further cause of error is that usually the roads report the mileage at the close of the year, while the report requires the average number of employees during the year. Of course we should have the average mileage and number of locomotives worked during the year, and in the case of companies that have largely increased their mileage and stock of locomotives during the year, this will result in a considerable error.

Neither is it certain that the companies have not included in some cases the number of employees engaged in construction, which would make them useless for comparing their service in operating the road and creating earnings and profits.

The gross earnings per employee, according to the figures as they come to us, vary from \$751 on the Chicago & Grand Trunk to \$1,944 on the Illinois Central. Generally they vary somewhat with the gross earnings

per mile; but the Illinois Central has light earnings per mile, and yet the largest earnings per passenger. The net earnings per employee are largest on the Northwestern and smallest on the Chicago & Grand Trunk, which was not fairly open except for two or three months of the year. Excluding this, the smallest earnings per employee are on the Wabash, which was such a variable property during the year—adding several new lines and having its service re-organized—that its averages cannot be looked upon as a sufficient criterion of its position. The only roads in the list, indeed, which did not change their mileage materially during the year are the Rock Island, the Illinois Central, the Lake Shore and the Michigan Central.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Carson & Colorado.—Track laid from Carson, Nev., eastward to New Jerusalem, 20 miles.

Southern Pacific.—Extended from Rio Minubres, N. M., east 23 miles.

Missouri Pacific.—The *Lexington & Southern Branch* is extended from Harrisonville, Mo., north to Pleasant Hill, 10 miles; also from Butler, Mo., south to Nevada, 30 miles.

New York & New England.—Extended westward to Danbury, Conn., 15 miles.

Denver & Rio Grande.—The *Leadville & Ten Mile* line is completed from Leadville, Col., to Robinson, 15 miles. The *Silver Cliff* line has track laid from Canon City, Col., west 10 miles. The *San Juan Division* is extended from Los Pinos, Col., west to Alta, 19 miles. The *New Mexico Division* is extended from Servilleta, N. M., south to Embuda, 28 miles. The *Gunnison Branch* extended to Poncho Springs, Col., 3 miles. Gauge, 3 feet.

Oakdale.—Completed from Oakdale Furnace, Tenn., west to the Cincinnati Southern, near Huntsville, 7 miles. Gauge, 3 feet.

Texas & Pacific.—Extended from Eastland, Tex., west to Baird, 35 miles.

This is a total of 215 miles of new railroad, making 5,839 miles thus far this year, against 3,594 miles reported at the same time in 1879, 2,243 miles in 1878, 1,964 miles in 1877, 2,283 miles in 1876, 1,264 miles in 1875, 1,808 miles in 1874, 3,606 miles in 1873 and 7,065 miles in 1872.

THE NEW YORK, LAKE ERIE & WESTERN REPORT has been published in full during the past week, and we present on another page a summary of the principal features which have not already been considered in connection with the reports of gross earnings, expenses and traffic that had been made public in advance of the full report. The chief additions are the earnings and expenses of the several subsidiary enterprises, such as the ferries, elevators, etc., which most companies would include with the other business of the company, and the details of equipment and of the expenditures for construction during the year. The enormous increase in equipment that this company has secured within two years is for the most part not owned by it, but leased with a contract to purchase on long time. About 9,000 freight cars have been added to its stock in that time, nearly doubling it. The cars and engines so contracted for (including some not yet supplied) will cost about \$5,100,000, on which the company pays interest until it has paid off the principal, which it does by installments, until when the title to the rolling stock will be in the Car Trusts. The amount paid on account of principal was \$100,645 in 1878-79, and \$621,010 in 1879-80; and during the current fiscal year it will be about \$950,000. Of course the necessity of paying interest on so large a share of its rolling stock, which most railroads own, reduces the surplus available for dividends; and so does the payment of installments of the principal; but it cannot be avoided without issuing bonds to pay for the rolling stock, and this could not have been done to advantage at the time the rolling stock was obtained. Moreover, the company's debt is a ready very heavy, for it owns little more than one-half (530 miles) of the 1,009½ miles of road it works, and a road with a debt of \$126,743 per mile ought to be fully equipped without incurring more debt. The New York Central, with an enormous equipment owned, has a debt of about \$53,780 per mile owned.

The surplus of the year was wholly devoted to paying for additions to the property, but this policy has been disapproved by some of the holders of preferred stock, who claim that they are entitled to their 6 per cent. dividends whenever there is a surplus sufficient to pay them—that is, a sufficient excess of earnings over working expenses, rentals and interest. A large part of the report of President Jewett, which we copy, is devoted to discussing the question of the rightful claims of the preferred stock. It is impossible to believe that any one supposed when the plan of reorganization was formed that the preferred stock would have any such rights as some of the holders now claim; otherwise the bondholders who funded their coupons went without their interest in order that these shareholders might receive dividends.

Since the report has been published another claim has been put forward which appears more reasonable. This is on the part of the holders of the income bonds, which were issued to the amount of \$508,000 in payment of assessments on the stock. On these interest is payable "at the rate of 6 per cent. per annum, or at such lesser rate for any fiscal year as the net earnings of the company for that year, as declared by the board of directors and applicable for that purpose, shall be sufficient to satisfy." The road is the property of the stockholders, and money expended in improving the road adds to the property which they own. This is not the case with bondholders. One coupon of the income bonds ma-

tured Dec. 1, but it has not been paid, though only about \$15,000—less than 1 per cent. of the surplus—would be required to pay it. Much depends on the terms of the mortgage, and doubtless the company has a reason for its course, though we have not seen any published.

THE STATE OF NEW JERSEY, as may not generally be known, has the right under the original charters to buy the works of the United New Jersey Railroad & Canal Company a few years hence at an appraised valuation. The time named was 30 years from the grant of the charters, but subsequent legislative acts have extended it in the case of the former Camden & Amboy road and the Delaware & Raritan Canal until 1888, and of the New Jersey Railroad until 1889. This right is not affected by the lease of the company's property to the Pennsylvania Railroad Company, for, in the acts authorizing and validating the lease, it was expressly stipulated that nothing in the acts or in the lease should be held to change in any way the relations of the company to the state, or the rights of the state in regard to the roads. Some attention has been called to the matter of late in New Jersey, and already there is a slight discussion as to the policy of the state in the matter. Probably this will increase as the time draws nearer, and it may become a leading question in state politics; at any rate, sufficient public attention will be called to it to prevent the passage of any act extending the time without full discussion. Should the legislature finally decide upon the purchase of the roads it would not affect the rights of bondholders. It is held, we believe, by the few lawyers who have given any attention to the subject, that the bonds of the company having been issued by the express or implied authority of the state, in case of a purchase the state would have to take the property subject to their lien; but the stockholders would have to be content with the amount by which the appraised value might exceed the obligations of the companies. The purchase of the roads is hardly a live question just yet, however, but some people have begun to think about it, and it will call out a good deal of discussion in the next few years.

CONGRESSIONAL RAILROAD REGULATION is proposed by Mr. McCoid, of Iowa, by a bill introduced last Monday, in a peculiar manner. He does not propose (at least not immediately or by this bill) to limit the rates of the railroads, but requires that, by the 1st of March next, they shall prepare schedules themselves, which shall give one uniform charge for loading and unloading, and one rate per mile for hauling a car, which rates shall not be deviated from under any circumstances. Thus the freight on a car load of corn from Kansas City to New York would be the same as the freight on a car-load of silk or other first-class merchandise from New York to Kansas City. It is a pity that such a law could not be tried for a year without ruining a large proportion of the people, especially Western farmers; for its operation would certainly teach some fundamental principles of transportation that otherwise seem likely never to become generally known. It would be about equivalent to an ocean of fire between the East and the West, through which nothing but the most valuable goods could pass. The lowest rates now are the lowest, not because railroad men have any particular affection for the goods carried at those rates, but precisely because those goods will not move by rail at a higher rate. If the road gets part of its income from goods that can afford to pay higher rates, the other freights are relieved of part of the burden that otherwise they would have to bear. And on the other hand, if an Eastern road gets part of its income from Western freight carried at low rates, the Eastern producer, though paying higher rates, still pays less than he would have to if there were no one else to help support his road.

NOVEMBER EARNINGS, so far as reported, are very satisfactory, considering that they were large last year. The *Commercial and Financial Chronicle's* list, which includes 49 roads, 15 of which, however, as yet had reported only for three weeks of the month, shows an increase of 20 per cent. in earnings and of but 16.3 per cent. in mileage, resulting in an increase of nearly 3 per cent. in earnings per mile of road. The figures may be considerably changed when the fuller returns come in from which we make our monthly table; the reports of the Pennsylvania and the Philadelphia & Reading are not yet made, and their earnings are so large a proportion of the whole that they have considerable effect on the totals and averages. The roads that have a large trunk-line traffic, that have so far reported for November, with their percentages of increase over last year, are: New York Central, 8.9; Grand Trunk, 7.7; Great Western, 7.6; Cleveland, Columbus, Cincinnati & Indianapolis, 15.3; Cincinnati & Springfield, 22.4. The warring Chicago roads seem to thrive on fighting, the Chicago & Alton showing an increase of 13.3, and the Hannibal & St. Joseph one of 5.5 per cent., while the Wabash, with an increase of 11 per cent. in mileage, has an increase of 23.3 per cent. in earnings. The Lake Erie & Western was not open through last year, and its increase of 80 per cent. in earnings is entirely without significance so far as this matter is concerned.

THE CHICAGO, MILWAUKEE & ST. PAUL, by its construction of the extension of the Chicago & Pacific, which it bought last spring, to Janak, makes itself a Chicago road to an extent which alters materially its position. It now has a line directly across Northern Illinois to the Mississippi of the same length as the Chicago & Northwestern's line to Clinton. It has, too, a line 191 miles long from Chicago to Rock Island, while by the Rock Island road the distance is

181 miles. In connection with its Dubuque Division (late Chicago, Clinton, Dubuque & Minnesota Railroad) it has a line 179 miles long from Chicago to Dubuque, which is shorter than any other, the Illinois Central in connection with the Northwestern being 190, and in connection with the Chicago & Iowa 201 miles. And in connection with its Sabula, Ackley & Dakota line it has a line from Chicago to Cedar Rapids 229 miles long, and only 10 miles longer than by the Northwestern. Heretofore this company has had a very indirect outlet to Chicago for all those parts of its system which are south of the latitude of Dubuque, which are precisely those parts which deal chiefly with Chicago and very little with Milwaukee. This short route is now secured, and the result should be to make a few hundred miles of its roads (part of which, however, it has not owned long), much more valuable than they have ever been before.

THE CANAL GRAIN BUSINESS has this year been larger than ever before. For four successive years the deliveries at New York have been, in bushels:

1877.	1878.	1879.	1880.
48,024,600	63,377,000	56,932,300	72,291,300

The increase over 1879 is 27 per cent. and the season was a little longer. It opened 18 days earlier but closed 10 days earlier. The arrivals, it appears, were 50 per cent. greater than in 1877. During the time of canal receipts this year, New York received about 54,000,000 bushels of grain by rail, or five-sixths as much as by canal. For the whole season down to the end of November 54.4 per cent. of the total New York receipts were by rail, 43.1 per cent. by canal, and 2.5 per cent. by coasting vessels. During the canal season the total receipts of grain at all ports were about 215,000,000, so that the canal brought one-third of the whole amount, the railroads to New York one-quarter, and of the balance of 88,000,000 bushels, nearly 12,000,000 arrived at Montreal by the St. Lawrence River, and the 10,000,000 of receipts at New Orleans in that time were probably nearly all by water. This leaves 66 millions of bushels carried by rail to Montreal, Portland, Boston, Philadelphia and Baltimore, while 54,000,000 bushels were carried by rail to New York.

THE PACKING SEASON opens actively. During the first month, November, 2,430,920 hogs are reported to have been packed, against 2,047,830 last year—an increase of 19 per cent. Chicago gains 42 per cent. and has packed 43.8 per cent. of the whole, against 36.5 per cent. last. Cincinnati stands next, but with a great interval, it having packed but 10.3 per cent. of the whole. The provision shipments from Chicago are less than last year by about 16 per cent. and provision exports by 2.4 per cent.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows: New York, Ontario & Western, annual meeting, at the office, No. 20 Nassau street, New York, Jan. 19, at noon. Transfer books close Jan. 1. Connecticut River, annual meeting, at the office in Springfield, Mass., Jan. 19, at noon. Cleveland & Pittsburgh, annual meeting, at the office in Cleveland, O., Jan. 5. Chicago, Burlington & Quincy, special meeting, in Chicago, Dec. 28, at 11 a. m., "to consider and act upon the propositions to consolidate, by purchase or otherwise, the stock, property and franchises of the Kansas City, St. Joseph & Council Bluffs Railroad Company, Hastings & Avoca Railroad Company, Moulton & Albia Railroad Company, Red Oak & Atlantic Railroad Company, Chillicothe & Charleston Railroad Company, Keokuk & St. Paul Railroad Company and the Madison & Keokuk Railroad Company, and of such other branch road companies as the meeting may deem it proper to include, with and into those of this company, and to determine whether the directors shall be authorized for this and other purposes, from time to time as they shall deem proper, to increase the capital stock of the company to the extent of the cost of the road, and to dispose of the same in such manner as they may see fit."

Dividends

Dividends has been declared as follows: Keokuk & Des Moines (leased to Chicago, Rock Island & Pacific), 1½ per cent. on the preferred stock, payable Dec. 23. This is the first dividend. Fitchburg, 3½ per cent. semi-annual, payable Jan. 1. Providence & Worcester, 3 per cent., semi-annual, payable Jan. 1. Richmond & Danville, 3 per cent., semi-annual. Northern Central, 2½ per cent. on the earnings of the year 1880, payable Jan. 10. This is the first dividend since 1876, when one of 3 per cent. was paid. Chicago, St. Paul, Minneapolis & Omaha, 1½ per cent. on the preferred stock, payable Jan. 23. This is the first dividend. Holyoke & Westfield (leased to New Haven & Northampton), 2½ per cent. from the earnings of the year ending Sept. 30 last. Georgi, 3½ per cent., semi-annual. The last dividend was 3 per cent. Worcester & Nashua, 1½ per cent., payable Jan. 1. This is the first dividend since 1876. Boston, New Bedford & Lynn, 3 per cent., semi-annual, payable Jan. 1. Lehigh Valley, 1 per cent., quarterly, payable Jan. 15.

Foreclosure Sales.

The Flushing, North Side & Central road was sold under foreclosure of mortgage Dec. 11, and bought in for account of the bondholders. The road was formed by the consolidation of the Flushing & North Shore and the Central, of Long Island, and has been for several years worked by the Long Island Railroad Company. It included a main line from Hunter's Point, N. Y., to Babylon, 24 miles, and 15 miles of branches. The total funded debt was \$2,642,000, consisting of separate mortgages on various sections of the road. Some of these sectional mortgages are in process of foreclosure separately.

The Washington City, Virginia Midland & Great Southern road will be sold at foreclosure sale in Alexandria, Va.,

Dec. 20. The sale will include the entire road, 346 miles in all, subject to the lease of the section from Strasburg to Harrisonburg to the Baltimore & Ohio Company; the purchaser will also be required to assume contracts made with the Charlottesville & Rapidan and the Franklin & Pittsylvania companies, and all liabilities of the Receiver. The terms are cash for a sum equal to all obligations secured by deeds of trust, except those secured by the mortgage of May 1, 1873, the sum of \$200,000 to be paid at the time of sale, the rest on confirmation of the sale; the balance of the purchase money a credit of one, two and three years, with interest.

Cleveland, Columbus, Cincinnati & Indianapolis Mutual Insurance Association.

At the annual meeting of this Association in Gallon, O., Dec. 8, reports were presented showing the society to be in a prosperous condition, with 1,123 members on the roll, a net gain of 11 during the year. The receipts on current expense account were \$619.46; payments, \$755.35, leaving a balance of \$214.11. During the year \$15,788 were paid out on 11 assessments for death and four for disability. The total amount paid on assessments since the first organization has been \$186,076.

The books were reported correct. Half assessments were ordered for two members, each of whom had lost a hand, and the usual business transacted.

ELECTIONS AND APPOINTMENTS.

American Electrical Society.—At the annual meeting in Chicago, Dec. 8, the following officers were elected: President, General Anson Stager, New York; Vice Presidents, C. H. Harkins, Milwaukee; R. C. Clowry, Chicago; E. P. Wright, Cleveland; O. H. Booth, Mansfield, O.; F. L. Pope, New York; Eliha Gray, Chicago; F. H. Tubbs, Chicago; Corresponding Secretary, F. W. Jones, New York; Recording Secretary, C. S. Jon, Chicago; Treasurer, E. B. Chandler, Chicago; Librarian, C. H. Wilson, Chicago; Executive Committee, C. H. Summers, J. J. S. Wilson, H. C. Maynard, M. G. Kellogg, J. P. Barrett, Chicago; Directors, C. O. Rowe, Pittsburgh; L. B. Firman, Chicago; S. D. Field, San Francisco; J. F. Wallick, Indianapolis; G. A. Hamilton, New York; C. W. Ross, Columbus, O.; W. W. Ketchner, Springfield, Ill.; H. H. Matlock, Davenport, Ia.; J. Chester Wilson, Altoona, Pa.; N. Hucker, Buffalo, N. Y.; W. K. Morley, Bloomington, Ill.; C. C. Reed, Jackson, Mich.; C. G. Merriweather, Mobile, Ala.; S. C. Mason, Moberly, Mo.; W. W. Smith, Indianapolis.

Baltimore & Ohio.—Mr. Thomas Fitzgerald has been appointed Supervisor of Trains of the Central Ohio Division. Mr. F. M. Mantz is appointed Supervisor of the Valley Branch, in place of Mr. Fitzgerald. Mr. J. A. Hilleary succeeds Mr. Mantz as Depot Master at Camden Station, Baltimore, and Mr. L. Watkins, long a conductor on the road, takes Mr. Hilleary's late position as Night Depot Master at Camden Station.

Boston, Clinton, Fitchburg & New Bedford.—At the annual meeting in South Framingham, Mass., Dec. 7, the following directors were chosen: Harrison Bliss, Charles Burleigh, W. W. Crapo, C. F. Crocker, Lyman Nichols, W. J. Rotch, John E. Sanford, Eugene V. R. Thayer, Nathaniel Thayer, Jr., W. B. Wood. The road is leased to the O. & N. Colony.

Boston & Maine.—At the annual meeting in Lawrence, Dec. 8, the following directors were chosen: Samuel E. S. Ring, Portland, Me.; Nathaniel W. Farwell, Lewiston, Me.; Amos Paul, South Newmarket, N. H.; Wm. S. Stevens, Dover, N. H.; James R. Nichols, Haverhill, Mass.; Nathaniel G. White, Lawrence, Mass.; Nathaniel J. Brantley, George C. Lord, John F. Osgood, Boston. There is no change from the late board.

Chicago & Alton.—Mr. C. H. Chappell, for some time past Assistant General Superintendent, has been appointed General Superintendent. The office of Assistant General Superintendent is abolished. There has been no General Superintendent of the road since Mr. McMullin was made General Manager. Mr. Chappell is an old Chicago, Burlington & Quincy man, and was for some time on their roads—lately the Missouri, Kansas & Texas and the Wabash.

Chicago, Milwaukee & St. Paul.—Mr. J. C. Boyden has been appointed General Northwestern Freight Agent, with office in St. Paul, Minn. He was recently Assistant Traffic Manager of the Chicago, St. Paul, Minneapolis & Omaha line.

Cincinnati, Wabash & Michigan.—Mr. O. W. Lamport has been appointed Superintendent, with office at Wabash, Ind. He has been on the Lake Shore road.

Cleveland, Columbus, Cincinnati & Indianapolis Mutual Insurance Association.—At the annual meeting in Gallon, O., Dec. 8, the following officers were chosen: President, Robert Blee; Vice-Presidents, C. C. Gale, C. C. Potter; General Secretary, George W. Burt; Treasurer, T. J. Higgins. The only new officer is Mr. Higgins, who replaces S. B. Jackson, who has left the road.

Connotton Valley.—At a meeting held in Canton, O., Dec. 1, the following directors were chosen: Wm. A. Lynch, A. B. Frol, T. S. Thierly, L. R. Tressell, John G. Yost, Canton, O.; J. H. Taylor, Carrollton, O.; Samuel Allen, Fell Roy, O.; Samuel Watts, Thomaston, Me.; Wm. J. Roach, New Bedford, Mass.; Liberty Bigelow, Albert W. Nickerson, Joseph B. Thomas, Cyrus Wakefield, Boston.

Delaware & Hudson Canal Co.—Mr. D. M. Kendrick has been appointed General Passenger and Ticket Agent. He was recently General Ticket Agent of the Indianapolis & St. Louis road.

Dorchester & Delaware.—At the annual meeting recently the following were chosen: President, John Webster, New Market, Md.; Directors, John W. Brown, R. G. Ellegood, James Gore, C. W. Jefferson, E. W. Leconte, George J. Meekins, John W. Wright, Nichols Wright, Messrs. Howard B. Ensign and E. R. Toslin are state directors. The board elected George J. Meekins Treasurer.

Eastern.—At the annual meeting in Boston, Dec. 8, the following directors were chosen: By the holders of debentures, John Cummings, Woburn, Mass.; George P. King, Richard Olney, E. B. Phillips, Alfred P. Rockwell, Boston; George S. Morison, New York. By the stockholders, Stephen J. Young, Brunswick, Me.; Jacob C. Rogers, Peabody, Mass.; Wm. B. Bacon, Boston. The board afterwards re-elected E. B. Phillips, President; E. C. Perkins, Clerk; N. G. Chapin, Treasurer.

Frankfort, Georgetown & Paris.—This company has elected the following officers: President, D. W. Lindsay, Paris, Ky.; Secretary, H. I. Todd, Georgetown, Ky.; Treasurer, Grant Green, Frankfort, Ky. The road is not yet built.

Galveston, Houston & Henderson.—Mr. S. M. Miller has been appointed Traveling Passenger Agent. He was formerly with the International & Great Northern road.

The sale of tickets over Baltimore & Ohio lines is now stopped at all Pennsylvania Railroad ticket offices.

Bangor & Piscataquis.—A committee of the City Council of Bangor, Me., to whom was referred the question of selling the city's interest in this road, recommend the sale to any responsible parties who will take up \$600,000 of the 6 per cent. and \$50,000 of the 7 per cent. city bonds issued in aid of the road, and will give security for the extension of the road from its present terminus at Blanchard, Me., to Moosehead Lake within three years.

Camden, Gloucester & Mt. Ephraim.—It is proposed to extend this road from Mt. Ephraim, N. J., south by west through Mullica Hill and Harrisonville to Woodstown. The distance is about 22 miles, through a level and easy country.

Canadian Pacific.—A dispatch from Ottawa, Ont., Dec. 11, says: "The Canadian Pacific Railroad syndicate arrangement will come up for debate in the House next week. The contract is with George Stephen and Duncan McIntyre, of Montreal; J. S. Kennedy, of New York; R. B. Angus and J. J. Hill, of St. Paul, Minn.; Morton, Rose & Co., of London, England, and Kohn, Reinach & Co., of Paris, France. The road is divided into four sections; the first extending from the western terminus of the Canada Central to the east end of Lake Nipissing, to be known as the Eastern Section; the second, from Lake Superior to Selkirk, to be known as the Lake Section; the third, extending from Selkirk to Kamloops, to be called the Central, and the fourth, from Kamloops to Fort Moody, B. C., to be called the Western Section. The contractors must deposit \$1,000,000 immediately after the organization of the company, in cash or approved securities, as a security for the construction of the railway. The government shall pay to the company interest on the cash invested, at the rate of 4 per cent. per annum, half-yearly, and shall pay over to the company the interest received upon the securities deposited. The eastern and central sections are to be constructed on the same platform as the Union Pacific when first constructed. Work must begin on the Eastern Section not later than July 1 next, and on the Central Section not later than May 1. These two sections are to be in running order by May 1, 1891. The section now under contract in British Columbia is to be finished by June 30, 1885, the remaining portion of the Western Section lying between Yale and Fort Moody is to be completed by the first day of May, 1881. The government agrees to grant to the company a subsidy in money of \$25,000,000 and 25,000,000 acres in land, for which subsidies the construction of the railway is guaranteed. The subsidies are to be paid and the road constructed as follows: The Central Section of 1,350 miles, the first 900 miles at \$10,000 per mile and \$1,000,000; the second 450 miles at \$15,333 per mile and \$6,000,000; total, \$15,000,000. The eastern section of about 650 miles on a subsidy equal to \$15,384.61 per mile, or a total of \$10,000,000. The land subsidy is divided as follows: For the Central Section, first 900 miles, 12,500 acres per mile, worth about \$11,250,000; second 450 miles, 16,666.66 acres per mile, worth about \$75,000,000; total 18,750,000 acres. The Eastern Section of 650 miles has a subsidy equal to 9,615.25 acres per mile, or 6,250,000, making a total of 25,000,000 acres.

"The company will be known as the Canada Pacific Railway Company. The directors will be George Stephen, Duncan McIntyre, J. S. Kennedy, R. B. Angus, J. J. Hill, H. Stafford Northcote, P. P. Grenfell, C. D. Rose, the three latter of London, England, and Baron Reinach, of Paris. The capital stock is to be \$25,000,000. The chief place of business is to be Montreal.

"This agreement is to be strongly opposed by the reform party. They contend that under its provisions the syndicate is at liberty to select twenty-five million acres of land anywhere in the Canadian Northwest as best suits them, and also that a monopoly of the railroad system of that country is given to them without any proper restrictions as to rates of freight. Another strong objection is that the section of 90 miles in British Columbia, which it is estimated will cost \$50,000 per mile, is to be constructed by the Government and handed over to the syndicate when built. The opposition take the ground that the line north of Lake Superior should not be constructed at present, but that the Canada Pacific should be extended to Sault Ste. Marie and a connection made with the Northern Pacific which would be extended to that point. A continuous line from east to west would thus be secured. The ministerial party have been in caucus nearly all day and there are evidences of dissatisfaction. The British Columbia members insist that a line should be built to connect Vancouver Island with the mainland, which was promised in the Carnarvon terms. The government state that the subject will be debated day by day from Tuesday next until disposed of, and there will be no adjournment and no Christmas holidays until this is done. The opposition are prepared to obstruct and retard business in every possible way.

Another objection very strongly urged is that the contract is said to give the company complete and perpetual exemption from taxation, both on its road and on all unsold lands.

Carson & Colorado.—Track on this road is now reported laid to New Jerusalem, Nev., about 20 miles eastward from Carson. Work is progressing steadily, and the contractors hope to have trains running to Walker Lake, about 60 miles from Carson, in January next.

Chicago, Burlington & Quincy.—At a meeting of the board in Boston, Dec. 11, it was voted to call a special meeting of the stockholders for Dec. 28, to vote on the question of consolidating with the company the Kansas City, St. Joseph & Council Bluffs and other controlled lines, and of authorizing an issue of additional stock as required by such consolidation.

Work is being pushed on the second track between Bristol, Ill., and Leland, 20 miles, as fast as the weather will permit. This will give the company a double track from Chicago to Princeton, 106 miles.

Chicago, St. Paul, Minneapolis & Omaha.—Continued reports of a consolidation of this company with the Chicago & Northwestern have been denied by officers of the company, who say that they are at least premature, and that no action has been taken.

At a meeting of the board this week the following statement was presented for the eight months from May 1 to Dec. 31, December earnings estimated:

Net earnings	\$508,808.12
1½ per cent. dividend on preferred stock	132,045.83
Surplus	\$354,762.29
Land contracts and bills receivable on hand, drawing 6 per cent. interest	500,000.00
In hand of State Treasurer of Wisconsin, trespass money due this company	150,000.00
Total	\$1,004,762.29

It was resolved to declare a dividend of 1½ per cent. on the preferred stock for the eight months.

Cincinnati Southern.—The new lease prepared by the board of trustees proposes to lease the road for a period not exceeding 25 years, on the following terms: The rent shall

be part of the gross receipts or earnings, made up quarterly, and graduated as follows: One per cent. thereof when they amount to the rate of \$3,000 per mile or under per annum; 5 per cent. if they exceed \$3,000 and are less than \$4,000; 10 per cent. if more than \$4,000 and less than \$5,000; 15 per cent. if more than \$5,000 and less than \$6,000; 21 per cent. if more than \$6,000 and less than \$7,000; 23½ per cent. if more than \$7,000 and less than \$8,000; 25½ per cent. if more than \$8,000 and less than \$9,000; 28 per cent. if more than \$9,000 and less than \$10,000, and 30 per cent. if more than \$10,000—the road to be counted and rated as 338 miles long.

The Cincinnati Railway Company, which now operates the road, proposes to take the new lease, and to increase its capital stock from \$2,000,000 to \$5,000,000.

Cincinnati, Wabash & Michigan.—The Michigan Central Company has given notice that it will oppose the crossing of its tracks at Niles by the proposed northern extension of this road. The opposition, it is understood, is based upon a section of the original charter of the Michigan Central.

Cleveland, Columbus, Cincinnati & Indianapolis.—This company has decided to increase its equipment by 10 heavy Mogul engines and 1,000 freight cars, and contracts will be let shortly.

Denver & Rio Grande.—On the Leadville & Ten Mile Extension of this road track is now laid to Robinson, 15 miles from Leadville, Col., and regular trains will soon run to that point.

Grading is progressing rapidly on the Silver Cliff line; 25 miles are finished and the track is laid for 10 miles from Canon City, Col.

The San Juan Division is now open to Alta, Col., 19 miles west from the late terminus at Los Pinos, and 51 miles from the junction with the New Mexico Division at San Antonio.

The New Mexico Division is now open for business to Embuda, N. M., 28 miles beyond the late terminus at Servilleta, and 73 miles from San Antonio. This line is to reach Santa Cruz, 23 miles further, this year.

Trains on the Gunnison Branch now run to Poncho Springs, Col., six miles from the main line at South Arkansas.

It is stated that the subscriptions for the new stock and bonds were nearly three times the amount offered. The allotments will be made in a few days.

Eastern Junction, Broad Sound Pier & Point Shirley.—The Massachusetts Railroad Commissioners have granted a certificate to this new company and approved the route. The line is from a point on the Eastern Railroad in Revere, Mass., to Point Shirley, about five miles.

East Tennessee & Western North Carolina.—Work is now progressing steadily on this road. The 16 miles of old grade have been repaired and contracts let for nearly all the 16 miles of new work. Tracklaying has been begun and will be continued steadily as the grading progresses. The line of the road is from Johnson, Tenn., on the East Tennessee, Virginia & Georgia road, eastward to the Cranberry iron estate in North Carolina, a distance of 32 miles.

Georgia Railroad Charters.—The Atlanta Constitution says of the Georgia Legislature which has just adjourned:

"The railroad acts of the recent Assembly were very important. Only three were passed. One was to charter the Atlanta & Alabama Railroad, with A. Austell, S. M. Inman, E. P. Howell, W. P. Inman, Anthony Murphy, J. W. English, E. W. Marsh, and other prominent men as incorporators. The bill provides for the construction of a road from Atlanta to some point on the Alabama line in the direction of the coal fields, and also prescribes that the capital stock of the company shall be \$2,000,000, with the privilege of raising it to \$5,000,000 in shares of \$100 each. So far as Atlanta is concerned this is the most important bill of the session.

"The bill to charter the Rome & Chattanooga Railroad provides for its management by J. W. Maddox, D. B. Hamilton, H. M. Smith and others, and that its stock shall be of the value of \$100 a share, and that the total amount shall not exceed \$1,500,000. As this road will connect Rome and Chattanooga, it will become an important factor in the great railroad problem of the South and West. It is possible that its construction will be begun at once and pushed to a speedy completion, as capital is already promised in amounts amply sufficient to secure the speedy success of the new road.

"The Buena Vista Railroad also received a charter, and will develop a country very much in need of a railroad. Its incorporators are F. W. Miller, T. L. Rogers, Edgar M. Butt, James M. Lowe, J. H. Dunham and other men in whom the public have confidence. The capital stock is limited to \$500,000, at \$100 per share. It is probable that the work of building the road will be begun at once."

The line of the last-named road is from Buena Vista in Marion County to a point on the Southwestern road.

Hartford & Connecticut Valley.—At the annual meeting in Hartford, Conn., Dec. 14, the directors were authorized to apply to the legislatures of Connecticut and Massachusetts for permission to extend the road on the west side of the Connecticut River to Holyoke. The cost of the new road will be about \$800,000, and it is proposed to raise this by the issue of \$400,000 new bonds and an equal amount of stock. No action was taken on the question of converting Connecticut Valley bonds into stock of the new company.

Havana, Rantoul & Eastern.—It is reported that this road has been sold to the Wabash, St. Louis & Pacific Company on terms not made public. It is said that the gauge will be at once changed from 3 feet to the standard and that some other improvements will be made. The road is 76 miles long, from West Lebanon, Ind., on the Wabash, west to Leroy, Ill., and is chiefly owned by persons living along the line.

Illinois Central.—This company's statement for November gives the earnings for that month as follows:

	1880	1879	Increase, P. C.
In Illinois	\$557,131.00	\$490,530.42	\$66,600.58 13.6
In Iowa (leased lines)	163,440.00	140,812.97	22,627.03 16.1
Total	\$720,571.00	\$631,343.39	\$89,227.61 14.1

In November, 1880, the land sales were 2,441.71 acres for \$13,814.71, and the cash collected on land contracts was \$19,584.43.

International & Great Northern.—A dispatch from Palestine, Tex., Dec. 14, says: "A rumor prevailed in this city to-day to the effect that Jay Gould had purchased the International & Great Northern Railroad. This is denied by its President, R. S. Hayes, who says a contract has been made between the Missouri, Kansas & Texas and the International & Great Northern, under which the former road would connect with the latter at Georgetown, and from thence would use the International & Great Northern track to San Antonio, from which point they would conjointly construct a road to Laredo."

Knoxville & Ohio.—At the adjourned annual meeting

in Knoxville, Tenn., Dec. 8, the following resolution was adopted:

"Resolved, That the directors be and they are hereby authorized to let the contract for the completion of the Knoxville & Ohio Railroad to the point of junction as soon as an agreement is entered into upon the part of the Louisville & Nashville Railroad Company, obligating themselves to construct their Knoxville Branch to the Tennessee state line."

A resolution was also adopted authorizing the creation of a mortgage on the road to the amount of \$1,300,000, for the purpose of raising funds to retire the present indebtedness, and provide the means for the new work.

Louisville & Nashville.—The Chancery Court at Nashville, Tenn., upon a petition filed by counsel for Robbins B. Smith, of New York, reciting all the facts in relation to the alleged violation of the injunction by this company in the issuance of the doubled stock, has made an order directing the company to show cause on Dec. 27 why a writ of injunction shall not be issued, or the defendant be otherwise punished for violation of the injunction in manner set forth in the petition.

Manhattan Elevated.—This company has extended what are known as the "commission" hours in which the fare on its lines is five cents. Heretofore these have been from 5:30 to 7:30 a. m., and from 5 to 7 p. m.; under the new arrangement they are from 5:30 to 8:30 a. m., and from 4:30 to 7:30 p. m. This change has been made chiefly to relieve the pressure on the trains during those hours.

Marietta & Cincinnati.—Receiver King makes the following statement for September and October:

September receipts	\$282,027
October	208,756
Total	\$490,783
September disbursements	\$281,000
October	274,700
Total	555,700

Balance to November account. \$24,084

The disbursements exceeded the receipts by \$983 in September and by \$23,996 in October.

Memphis, Paducah & Northern.—A suit has been begun in the United States Circuit Court at Memphis, Tenn., by Abraham Karl Wertheim and others to foreclose the mortgage on this road. The bill alleges that the company has made default in interest, and that the trustees have refused to take any action, thereby compelling individual bondholders to protect their own rights.

Missouri Pacific.—The Lexington & Southern Division has been extended from the late terminus at Harrisonville, Mo., on the Kansas & Arizona Division, north to Pleasant Hill on the main line, a distance of 10 miles. The work of extending this branch southward has also been pushed, and regular trains now run to Rich Hill, 12 miles southward from the late terminus at Butler, and track is laid to Nevada on the Missouri, Kansas & Texas, about 18 miles south of Rich Hill, and 68 miles from Pleasant Hill. This extension reaches the large coal district about Rich Hill, and can also be used as a short connection to Kansas City for the Missouri, Kansas & Texas.

Nashville, Chattanooga & St. Louis.—A dispatch from Nashville, Tenn., Dec. 15, says: "An amended bill will be filed to-morrow in the United States Circuit Court at Nashville in the case of the minority stockholders of the Nashville, Chattanooga & St. Louis Railroad Company against the Louisville & Nashville Railroad Company, charging that the election of the acting board of directors was a nullity; that the officers and agents of the Louisville & Nashville road, with Stevenson, Baldwin, Evans and Fogg, were combining and working to depress the stock and discredit the company; that the Louisville & Nashville, in violation of its charter, is operating the Nashville, Chattanooga & St. Louis for its own benefit, and praying for an injunction to enjoin the Louisville & Nashville Company from operating the road and from voting the stock it bought, and also praying for a receiver. Judge John Baxter and Judge Key will hear the case at Knoxville, on Tuesday, the 21st. inst."

Natchez, Jackson & Columbus.—The city of Natchez, Miss., has voted to subscribe \$225,000 in bonds in aid of the completion of this road.

New Bonds.—New issues of bonds placed upon the market are noted as follows:

The Cincinnati Northern offers, through George Wm. Ballou & Co., of New York and Boston, an issue of \$1,000,000 first mortgage 6 per cent. bonds, having 40 years to run. The company is successor to the Miami Valley Company, and owns a partly finished narrow-gauge line from Cincinnati to Waynesville, 42 miles; a branch to Dayton is to be built also.

New York & New England.—The track of this road is now laid to Danbury, Conn., 27 miles westward from the old terminus at Waterbury. Regular trains will soon run to the new terminus. Work is progressing steadily on the extension to Brewsters.

New York, Pennsylvania & Ohio.—The following official statements made to the New York Stock Exchange on the admission of the prior-lien and first-mortgage bonds to the lists may be of interest:

The company's total mortgage debt is as follows:

Prior lien mortgage, payable in United States gold coin or sterling	\$8,000,000
First mortgage, payable in United States gold coin or sterling	35,000,000
Second mortgage, payable in United States gold coin or sterling	14,500,000
Third mortgage, payable in United States gold coin or sterling	30,000,000
Total	\$87,500,000
Capital stock, common	\$35,000,000
Capital stock preferred	10,000,000
Total capitalization	\$132,500,000

None of the stock has been issued to the public yet. It is non-voting beneficiary stock, the voting right being invested in voting trustees until the third-mortgage bondholders receive 7 per cent. per annum during three years. The second-mortgage bonds mature May 1, 1910, and the rate of interest is 5 per cent. per annum, the first coupon becoming due May 1, 1881, if the net earnings or rental of the road shall be sufficient to pay it, but the interest is non-cumulative. The third-mortgage bonds mature May 1, 1915, and the rate of interest is 5 per cent.; the first coupon becoming due May 1, 1881, if earned; this interest also is non-cumulative. The second and third-mortgage bonds are included in the same mortgage. No right of action at law upon the bonds and coupons thereof, or of foreclosure, will accrue to the holders of these two classes of bonds. In the event of a surplus remaining, after paying interest on all the bonds of the company, and of 1 per cent. per annum dividend on common and preferred stock, such surplus will be

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